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MARCH 1934

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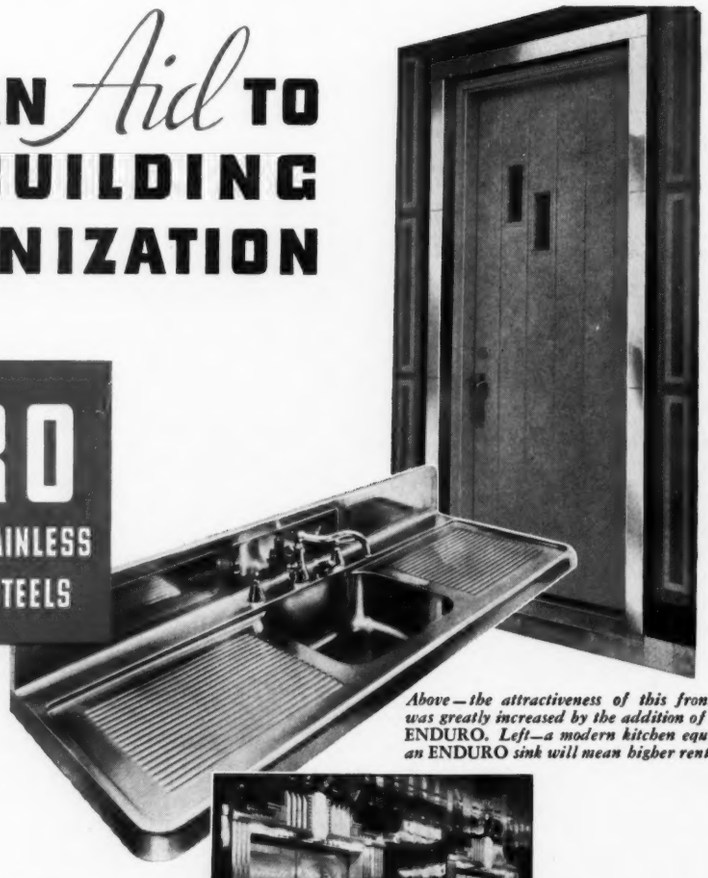
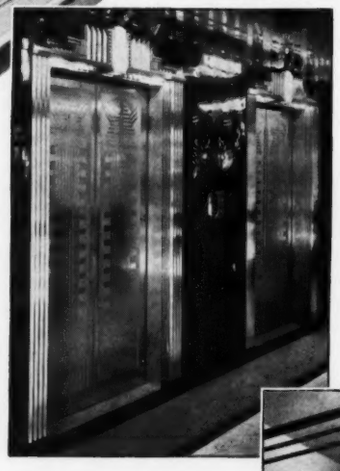


Above—the attractiveness of this front entrance was greatly increased by the addition of a frame of ENDURO. *Left—a modern kitchen equipped with an* ENDURO *sink will mean higher renting value.*



A little touch of ENDURO *will work wonders in decorative design. Note the pleasing effect obtained by* ENDURO *trim on these elevator doors.*

A LITTLE money and a lot of ingenuity can make startling changes in old buildings—can add years to their useful life and bring increased returns to the pockets of their owners.

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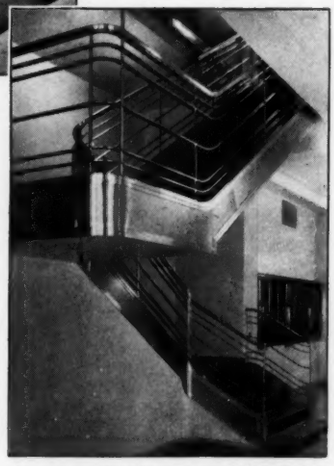

Very unusual is this staircase of ENDURO. *Unique effects often increase property values many times over the actual cost of making the change.*

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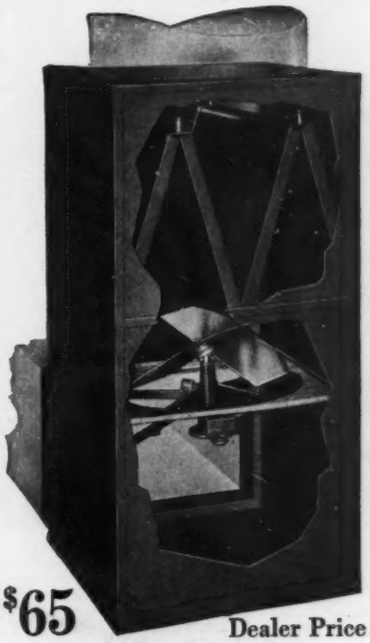

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FURNACES AND SHEET METALS AND Warm-Air Heating

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More than 7,000 copies of this issue are being distributed.

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NRA
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It may be that a well-known name *will become even more helpful* in selling

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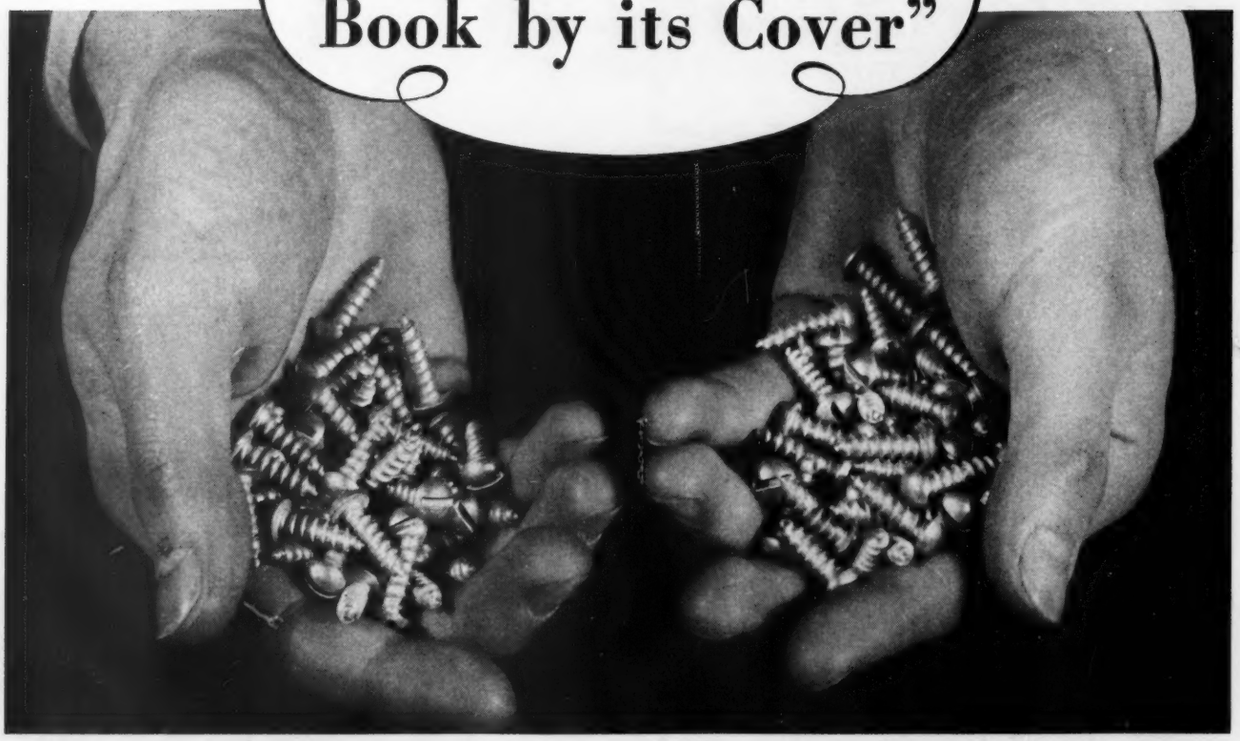
"You can't tell a Book by its Cover"



Nor can you judge screws for assembling sheet metal on "looks"

Who wrote it? That's what you want to know in picking a book. For the writer . . . not the cover . . . tells the difference between a good and a poor book.

To be safe, use the same guide when you pick screws for assembling sheet metal. KNOW THE MAKER! For appearance doesn't tell whether a screw actually will save time and labor. An imitation may "look like" a genuine Sheet Metal Screw . . . made only by PARKER-KALON.

"Looks" and hardened threads, alone, never would have built the reputation which genuine Parker-Kalon Hardened Self-tapping Sheet Metal Screws have for cutting sheet metal assembly costs. That is the result of *the way* the Screws are made, and *what they are made of.* Genuine Sheet Metal Screws save on a job because of uniform *perfect action.* They *always* go in easily and quickly . . . *always* form a perfect, strong-holding thread . . . *always* draw up tight without breaking.

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★ THEY HOLD . . . because the threads run full diameter right up to the head. ★ THEY GO IN EASILY . . . because the threads are (1) designed with an expert knowledge of the work they must perform (2) held to a high degree of accuracy and uniformity. ★ THREADS DON'T STRIP . . . HEADS DON'T TWIST OFF . . . because they are made from a high grade steel wire of special analysis and are scientifically hardened by a process developed from 20 years' experience in the manufacture of Self-tapping Screws.

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The production of steel for this special sheet is watched with unusual care. Only steel that shows this desirable quality of softness, but which at the same time maintains the right degree of sturdiness is used. You pay nothing extra for this special stock—Remember the name Granite City Galvanized Soft Forming Stock. For better steel and better service to the Mississippi Valley, the West and the Southwest, specify Granite City Sheets.
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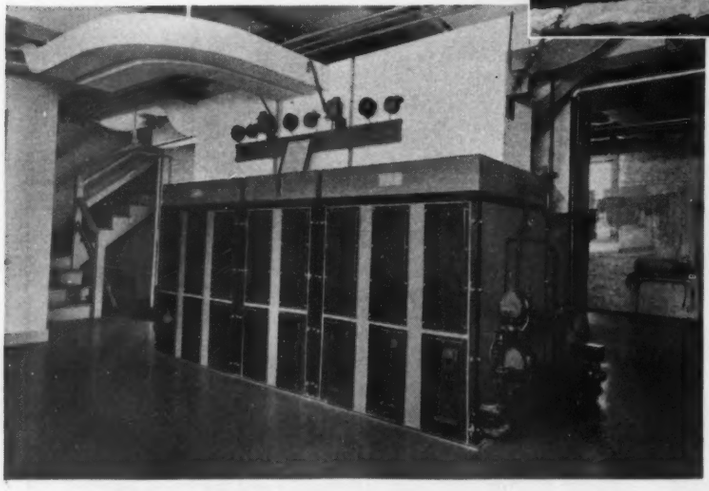
Sunbeam Dealers Make Sales To Residences of This Type

Illustrated at the right is the new home of Don A. Davis, President of the Western Auto Supply Co. Located in Kansas City, Mo., this home cost well in excess of $100,000. It is approximately 125′ x 60′ on the foundation, with 28 rooms and baths. The basement, first and second floors are Air Conditioned by the Sunbeam Unit illustrated below. Edw. W. Tanner of Kansas City was the architect.



Illustrated at the left is the 8 section, Sunbeam Gas Fired Air Conditioning Unit with an input of 560,000 Btu per hour, which Olson Bros. of Kansas City sold, engineered and installed in the Davis residence. This unit was purchased through the Sunbeam jobber, U. S. Supply Company, Kansas City. A Zone Control installation, temperature in winter is regulated by 7 thermostats each controlling a Duct Damper Motor in each trunk line leading to each of the 7 Zones. This system is engineered so that a refrigerating unit can be added later for summer dehumidification and cooling.

No residence is too large, or too costly, or too elaborate, for Sunbeam Air Conditioning. No Sunbeam Heating Contractor need pass by or lose any large sale—and large profit—because he cannot provide heating or air conditioning equipment that is adequate and suitable for the installation.

Whether the home owner needs an 18″ coal-fired, pipeless furnace for a 4-room cottage or an Air Conditioning Unit for a $100,000 mansion, there is a Sunbeam Furnace, cast iron or steel, pipe or pipeless, or a Sunbeam Air Conditioning Unit for coal, oil, or gas, for every purchaser whom you are trying to sell. The coupon will bring you particulars and the name of the Sunbeam Jobber who serves your locality.

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VOLUME 103 AMERICAN ARTISAN NUMBER 3

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Codes and Summer Sales Plans

We've Only Begun

It will be too bad for the industry if the high expectations held for better business conditions under the provisions of our code should be nullified because members feel their job is done when the code is signed.

The signing of the code is not the end of the struggle. It is only the beginning. As we pointed out last month, the battle to get the code signed, to determine who is included and who is to be left out, how the code should be worded are not the battle —they constitute only the preliminary skirmish.

If, as we hope, the code is signed shortly it will then be up to us as an industry to make the provisions effective. These rules and regulations over which we have argued so strenuously will revert to their proper status—the fabric of the agreement—leaving as the actual day to day regulations those code provisions which govern fair practice.

Last month we pointed out the importance of Article IV which covers bidding above cost, keeping cost records, applying overhead, etc. In other words, the financial end of every contractor's business.

There are other regulations equally important. The code states that our industry includes waterproofing and damp-proofing of many types of structures. There will be complaint about that. The code defines the qualifications of a contractor. Did you read these qualifications in the code as published in our February issue? If not, we suggest you do so and see if your firm meets the specifications.

There is a world of controversy packed into the section outlining fair practices. We shall not use seconds or inferior material. We must comply with all local laws and codes. We cannot place future or blanket orders for material we can't use right away. We cannot rebate to our mechanics. We cannot accept bonds, securities, notes, stocks, warrants, etc., in part or whole payment for work we do. We shall not itemize lump sum bids until we have the signed contract.

Every paragraph contains regulations which are going to upset many of the "smart" methods which have thrown the industry into turmoil.

From letters pouring in asking for information on the code we are lead to believe that too many contractors have given this code only a sketchy reading. Such a reading won't do. You are apt to wake up some day to the fact that a fine is hanging over your head. The best thing to do is to take the code home and study each paragraph carefully.

•

Summer Activity

Some readers may think it a little early to be talking about summer cooling, particularly those readers who are blanketed in snow.

However, there are some things relating to summer cooling which will stand thought and consideration this month.

Some men in the industry are saying that cooling will never be a real factor in our work. These men base their statements on the cost of summer cooling, both initial cost and operating cost, for a period of time which is short and bearable with some small discomfort.

We ought not loose sight of the fact that while cooling may seem expensive now, so did the automobile, the radio, the game of golf, winter vacations, to name a few accepted expenditures. And we should also remember that we are learning new things about cooling every month.

What are we learning? Well, we have learned recently that proper attic and second floor ventilation by means of an inexpensive fan will reduce the cooling load about two-thirds. We have learned that awnings on south, east and west windows further reduce the cooling load. That intelligent opening and closing windows, pulling blinds and other things our grandmothers used to do until we ridiculed them out of it are not old wives' tales, but real expense savers in cooling.

We have learned a great deal about the advantage of insulation, especially insulation in the attic floor to prevent loss of heat through the ceiling in winter and entrance of heat through the same ceiling in summer.

All of these practical ways of reducing the cost of cooling are of interest to home owners. More important is the fact that any heating contractor can sell these cost savers and thereby make an additional profit.

Late winter is none too early to lay out the program of reading so as to be ready to answer questions. It is none too early to devise a sales program for the spring and summer months.

Fabricating and Installing Methods On A Large Air Conditioning System

THE Civic Auditorium of Grand Rapids, Michigan, a structure costing approximately one million dollars and opened in the spring of 1933 is designed to be adaptable to a wide variety of uses. In the building there are three major units—a main auditorium, a small auditorium and an exhibition hall in the basement, together with the accompanying stages, dressing rooms, offices, meeting rooms, lobbies, storage rooms and so forth.

The three main units—large and small auditoriums and exhibition hall are heated by indirect means through systems which heat, ventilate, humidify, dehumidify, clean and cool all air introduced. Because of the large areas so treated and the purposes to which these halls are put, the heating and ventilating systems used are interesting because of the numerous unusual features of sheet metal fabrication and erection.

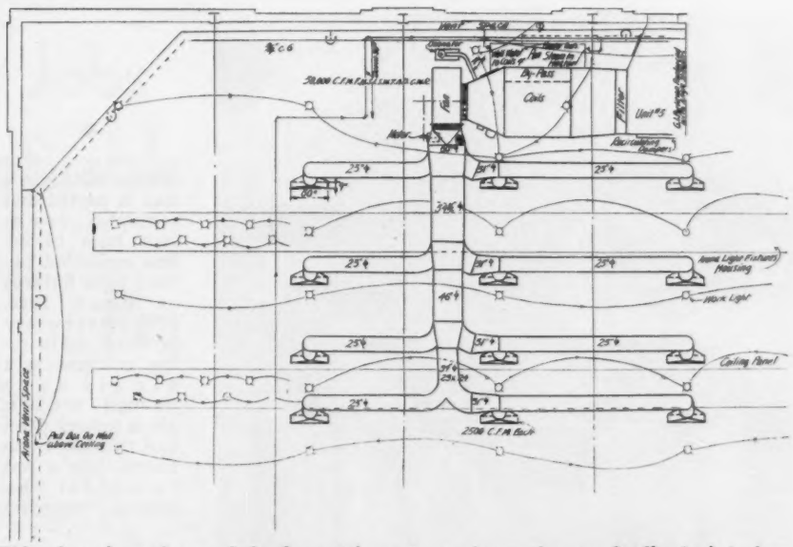
The fabrication and installation of the conditioning systems was let to the Glendon A. Richards Company, Grand Rapids sheet metal contractors and amounted to about $66,000. This contract price included the fans, motors, heating and cooling coils, air washers and filters, comprising about 45 per cent of the total contract price.

Main Auditorium

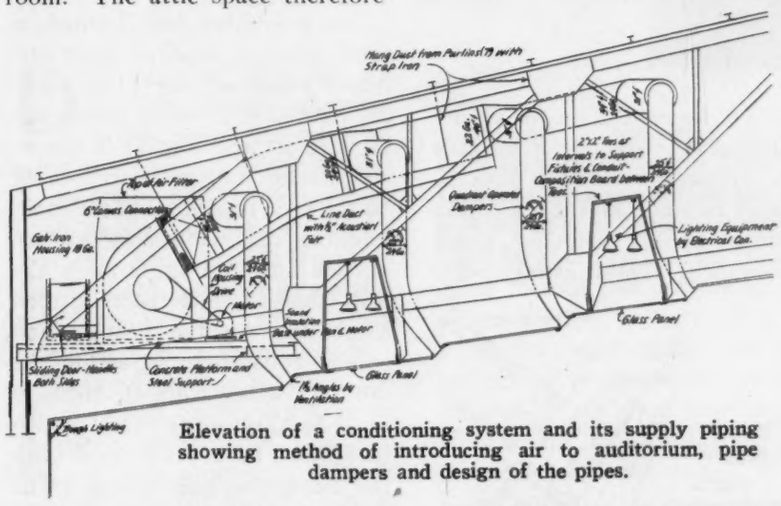
One of the detail drawings shows a plan view of one of the four conditioning units used for the main auditorium. Excepting for some small differences in the piping system all four units are identical in design and operation.

Exterior of the building and, above, a view of the main auditorium attic and the piping system for two conditioners.

The four conditioning units are located in the attic space above the auditorium with two units on each side. Each unit discharges through a duct system to openings in the ceiling as shown on the plan. The openings have no grilles and direct the air downward at an angle toward the center as shown on the elevation of one of the attic systems. The air is vented through grilled openings in the balcony overhang and also through 360 eight-inch mushroom vents in the upper part of the balcony to the space below the balcony and thence to the attic through a furred space running around three sides of the room. The attic space therefore



This plan view of one of the four attic systems shows the standardized pipe sizes used. The reducer sections, diffusers, and housing for apparatus are also illustrated.



Elevation of a conditioning system and its supply piping showing method of introducing air to auditorium, pipe dampers and design of the pipes.

serves as a return air chamber from which air is drawn to the conditioning units.

A monitor is provided on the roof with controlled louvers so that all or part of the return air may be vented.

Each conditioning unit connects with a duct system serving twelve openings. The duct system consists of round pipe decreasing from 60-inch diameter at the fan to 34 inches at the last branch. All branches, in turn, are identical in size varying from a 31-inch diameter at the main to 23 inches at the transition to the opening. This standardization of pipe sizes made it possible to fabricate all duct work in the Richards' shop.

The diffuser with dampers and blades was placed over the steel work as shown here and the remainder of the pipe line was then connected up. Note the reducer sections next to the mains.

Pipe Layout

Standard size materials in convenient sections were delivered at the job and assembled by riveting two or three cross seams. For shop fabrication, scale shop drawings were made from the structural steel drawings thus making possible field assembly of standard sizes.

All transitions carrying the diffusers are located to straddle structural steel members as shown on one of the photographs. This enabled the contractor to fabricate the diffusers and transitions in the shop, cut to fit the steel and erect the sections in the attic before the pipe was connected up. What little variation in length resulted was taken up by lengthening the Tee connections.

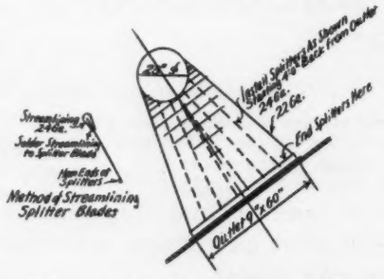
The exhibition hall is heated and ventilated from four lines of inlets concealed behind light fixtures as shown here. The entire bay between adjoining columns is a single duct through which air is passed from end to end. Each fixture has a rod to adjust the damper (see text)

In erecting procedure, the transition section with diffusers and dampers in place in one section was set in place and fastened. The sections of round pipe making up the branch (about 20 feet long) were then hoisted and held in place with ropes and pulleys. The cross seams were then riveted and the ropes were replaced by the permanent iron rod hangers secured to the duct by angle iron bands with the upper ends fastened to the roof girders.

All round pipe was made up from 24 and 22-gauge galvanized iron reinforced with angle iron bands. All sections of round pipe were riveted. An interesting feature of sound prevention and transmission methods is indicated by the use of canvas collars at all fan openings while the pipes themselves are insulated on the inside by felt to deaden any mechanical or air noise. This inner pipe lining extends completely through each main and branch pipe.

In hanging the main and branch pipes where the pipe was too far above the bottom truss chords the contractor used a steel riveters' scaffold for the workmen and the ropes and pulleys mentioned above.

It will be noticed on the piping plan that the reduction from main pipe diameter to branch pipe diameter is made at the transition with no further reduction along the branch. These fittings were



made on the job with equipment from the field shop. The mains were not cut for branch openings in the shop, but this cutting for the branch was all done in the field.

Small Auditorium

The conditioning unit for the small auditorium is located in a fan room above the assembly hall stage and discharges by means of duct work in the attic through ornamental plaster grilles in the ceiling. Air is vented from the room through grilled openings below the stage and thence up a flue to the fan room where it may be vented to the atmosphere or recirculated as for other conditioned rooms.

The type of duct work used and methods of carrying air are identical with the main auditorium and the methods of fabricating and erecting are also the same.

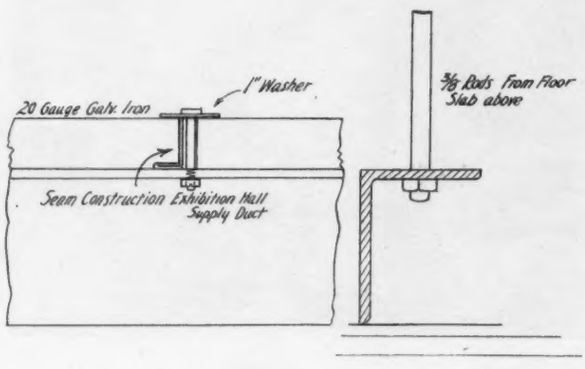
Exhibition Hall

The exhibition hall, located in the basement, required quite different handling since the ducts are located in a furred down ceiling and are rectangular in shape. The conditioning units are located on the attic floor level of the main auditorium. Each unit has an outside air opening through the wall, then the filter section, then a housing for the heating and cooling coils, then the fan and the fan duct which connects to the 4 by 7-foot masonry flues which lead down to a point level with the exhibition hall ceiling. The air coming down the flues is carried through large ducts which run the length of the hall. The openings into the hall from the ducts are through openings concealed behind the lighting fixtures as shown in a photograph.

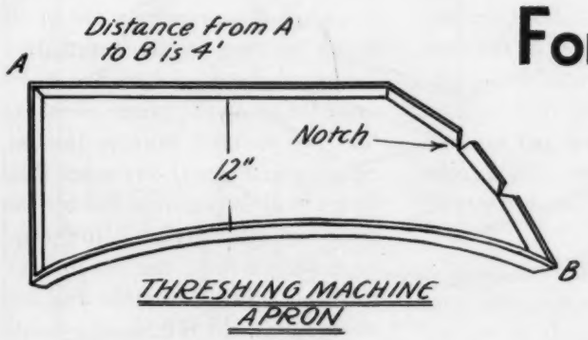
Air from the hall is drawn across the floor to vent galleries along the side walls. Because

(Continued on page 26)

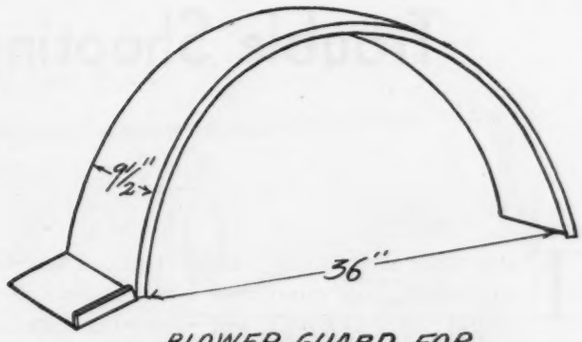
Right—Construction of the exhibition hall ducts showing method of joining sections and, above, a detail of an attic diffuser showing splitter blades and their construction.



"Odd Minute" Jobs Prove Profitable For Denver Sheet Metal Contractor



THRESHING MACHINE APRON



BLOWER GUARD FOR THRESHING MACHINE

DURING the peak of the threshing season when the farmer needs every available piece of equipment, time losses due to machinery failures mean money losses to him. Capitalizing on this need, the Sun Furnace Works of Denver, Colo., has built up a profitable summer and fall trade in threshing machine blower guards.

"It is seldom that a farmer can afford to wait for his supply house to order a blower guard," C. A. McFarland, proprietor, says. "If his machine gives out during threshing season, he has our sheet metal man make the piece—and after once having patronized our establishment, he often comes back the next time, even if he is not in a hurry."

The guard and apron which goes with it, is made of 18 gage metal. The blower guard is made in semicircular form and measures 9½ inches in width and 6 feet in circumference—approximately 36 inches in diameter. It requires approximately 10 pounds of metal while a little over 8½ pounds is used in the apron.

Making the two pieces of equipment is a 1½ hour job for one man. The labor is figured at $2 per hour and metal at 10 cents a pound. A profit of four cents a pound on 19 pounds of metal amounts to 76 cents while labor profits on 1½ hours work are $1.13. Thus, the job nets about $1.90.

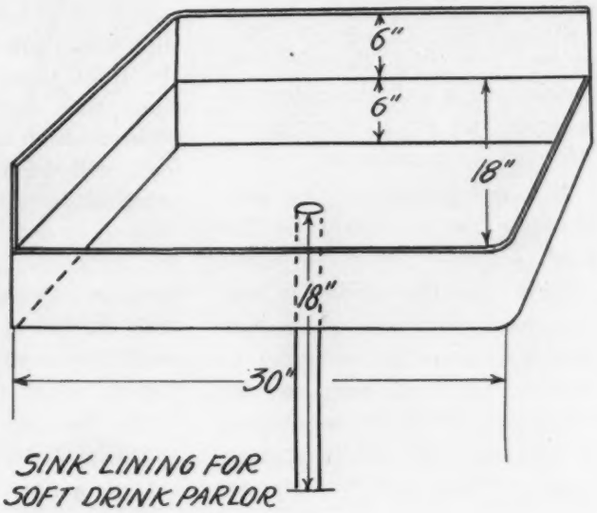
Although a large part of this work is secured directly from the farmer, store and sidewalk displays have resulted in several sales since many farmers pass the Sun plant in going to seed and produce houses located nearby.

Another "odd-minute" job that has proved profitable for the Sun Furnace Works is the manufacture of metal sink linings, sold to owners of small soft drink stands, to be placed in the old fashioned wooden sink so much used by them in cooling beverages.

An average sink such as the one shown in the accompanying diagram, measures 30 by 18 by 6 inches with a six-inch flange on one end and the back side. A sheet metal drain, equipped with stopper, is 18 inches long. It is made of 26 gage metal, as is the rest of the lining. Retailing at $5, this sink lining yields better than $2.50 profit.

These sink linings are sold on the basis of economy, lasting quality, and convenience. A wooden container lined with metal takes much less ice than a tub or metal vat such as are sometimes used. One user of a sheet metal lined wooden container stated that his ice costs were from 50% to 75% lower than when he used an all metal container. An ordinary wooden sink may be used to support the metal or a frame may be easily constructed by the owner.

The drawing to the right shows a typical low cost sink fabricated for sale to sellers of soft drinks and eating houses. Above are two drawings of the farm machinery equipment made for rush repairs



SINK LINING FOR SOFT DRINK PARLOR

Trouble Shooting—

Some tests and instruments every contractor should understand

THE three instruments that no forced air contractor should be without and should understand are the draft gauge, anemometer and psychrometer.

The anemometer is the most costly and requires careful manipulation. Good draft gauges are reasonable in price and if one possesses two accurate dry bulb thermometers a psychrometer may be constructed in a few seconds with a piece of cloth wrapped around the bulb of one thermometer and moistened with water at room temperature.

Trouble Shooting

If we have trouble with a forced air system we have several places to look for the fault. The correct instruments, properly used, help us find the difficulty. If, after the proper firing, etc., our system does not function it is due to one or more of several things—poor draft, lack of air due to too high a static loss, etc.

In checking trouble we would usually refer back to our data sheet and see that the various rooms require a certain c.f.m. at a given temperature at the register face. We obtain the inlet temperature with a thermometer and measure the air at the register face with an anemometer.

A rough sketch of the anemometer is shown in Fig. G. The small propeller fan turns in the air flow, and the number of revolutions is registered on the dial. The instrument is calibrated to measure air flow, speed, and we "clock it" or observe the number of revolutions turned in a given length of time, usually 1 minute. Thus, if our dial shows that the fan made 150 revolutions in one minute our air flow is at the rate of 150 feet per minute. As our c.f.m. equals square feet of area times velocity in feet per minute, and our register has 1½ square feet we have 1½ times 150 equals 225 c.f.m.

Our flow over register faces is generally varied or irregular and our anemometer should be passed over the face during the time of test as shown in Fig. A. If there are dead spots on the sides, top or bottom, the area that is delivering is tested after being measured for the square feet as shown in Fig. B.

If the c.f.m. is below the required volume it may be due to a volume damper and a test of all the inlets should be made. If our total for all registers is low we must look to the fan. Let us say that we have installed a fan that was specified to deliver the required c.f.m. against a static pressure of .12 inches of water. We should then test the system for the static pressure.

Static Pressure

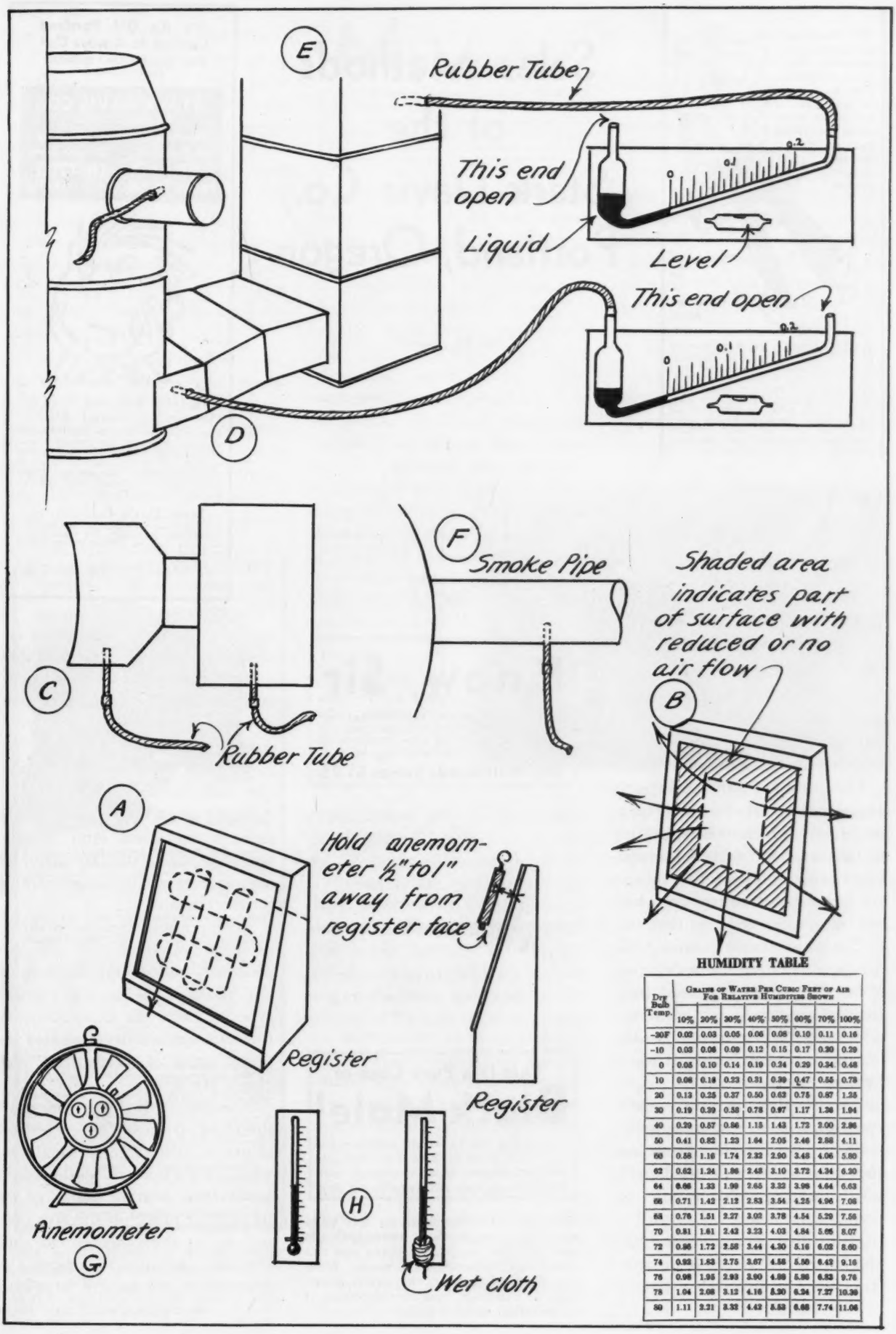
Absolutely accurate static pressure losses are found only with the Pitot tube, but we will assume that our readers have a plain draft gauge and our findings will be close enough for practical purposes. We take our reading as near the fan discharge and intake as possible. For static pressure loss our reading is taken with the end of the tube at right angle to the airflow as shown in Fig. C. Both the discharge and intake loss must be taken and added for the total loss.

Draft gauges will contain alcohol or oil depending on the type of gauge. The readings are graduated to read in the equivalent inches of water. As we are interested only in the static pressure loss we punch a hole in the fan housing and insert our tube. The liquid will move from 0.0 up the scale and after giving it the proper time we note the reading on the scale. For the intake and discharge sides of the fan the hook-up to the draft gauge is shown in "D" and "E".

Chimney Draft

If we find that our total static pressure is below .12 we increase the speed of the fan until the registers have their proper c.f.m. If the static of our problem is over .12, send for an engineer. To test the draft in the smoke flue we insert the tube in the smoke pipe near the furnace as shown in Fig. F and make the hook-up to the draft gauge as shown in Fig. E. If our draft reading, with the check closed and a good fire in the heater, is less than .13 inch we are in trouble. If the liquid in the tube vacillates to any great extent during the smoke flue test the chimney needs a top or cap, or may be too low and needs to be raised.

For our psychrometer, we find such a home made instrument sketched in Fig. H. We also show a table showing the relative humidity for the differential between the readings on the wet and dry bulb thermometers. The wet bulb thermometer must be fanned briskly for a minute or more or until such time as the mercury ceases to drop. Do not stand too near the thermometers during the test.



HUMIDITY TABLE

Dry Bulb Temp.	Grains of Water Per Cubic Feet of Air For Relative Humidities Shown							
	10%	20%	30%	40%	50%	60%	70%	100%
-30F	0.02	0.03	0.05	0.06	0.08	0.10	0.11	0.16
-10	0.03	0.06	0.09	0.12	0.15	0.17	0.20	0.29
0	0.05	0.10	0.14	0.19	0.24	0.29	0.34	0.48
10	0.08	0.16	0.23	0.31	0.39	0.47	0.55	0.79
20	0.13	0.25	0.37	0.50	0.63	0.75	0.87	1.25
30	0.19	0.39	0.58	0.78	0.97	1.17	1.36	1.94
40	0.29	0.57	0.86	1.15	1.43	1.72	2.00	2.86
50	0.41	0.82	1.23	1.64	2.05	2.46	2.88	4.11
60	0.58	1.16	1.74	2.32	2.90	3.48	4.06	5.80
62	0.62	1.24	1.86	2.48	3.10	3.72	4.34	6.20
64	0.66	1.33	1.99	2.65	3.32	3.98	4.64	6.63
66	0.71	1.42	2.12	2.83	3.54	4.25	4.96	7.08
68	0.76	1.51	2.27	3.02	3.78	4.54	5.29	7.56
70	0.81	1.61	2.42	3.23	4.03	4.84	5.65	8.07
72	0.86	1.72	2.58	3.44	4.30	5.16	6.02	8.60
74	0.92	1.83	2.75	3.67	4.58	5.50	6.42	9.16
76	0.98	1.95	2.93	3.90	4.88	5.86	6.83	9.76
78	1.04	2.08	3.12	4.16	5.20	6.24	7.27	10.39
80	1.11	2.21	3.32	4.42	5.53	6.63	7.74	11.06

Sales Methods of the Stark-Davis Co., Portland, Oregon

By

N. N. Swett

"ADVERTISING plays an important part in our sales promotional programs," says A. J. Davis, owner and manager of the Stark-Davis Co., Portland, Oregon, heating firm.

"Our advertising is diverted into three strong mediums, namely, those of newspaper displays, daily radio broadcasts, and last—the potent factor of customer advertising."

The newspaper advertising campaign consists of varied types of display. Once weekly, heating installations are featured in displays ranging from single column six-inch layouts to layouts which are two and three times that size.

The small layouts usually feature a moderate price installation. When larger space is used institutional copy tells of the newest developments in air conditioning, or some of the better types of heating plants.

Occasionally, when smaller spaces are used, humorous advertising, illustrated by clever cartoons, wherein the wisdom of good heating plants are expounded is adapted.

Daily display ads consist of a single column one-inch space wherein caption catches the eye of the reader.

Stark-Davis radio broadcasts are given from 5:30 to 6 p. m. three times weekly on Tuesday, Thursday and Saturday. An excellent musical entertainment is supplemented by advertising announcements which are presented to radio listeners in the form of clever human interest skits.

A typical skit on heating installations will run somewhat like this:

"A woman met one of her friends in the Stark-Davis Co. store at 188 Fourth Street, Portland, Oregon, where she had been looking at one of those new Round Oak exclusive oil burning, air conditioning systems that give year round service. The women talked about various things of interest, and finally one of them asked the other, 'Do you and your husband use the budget system in your housekeeping?' 'Oh, yes,' replied the other woman, 'we never go in debt beyond a certain sum each month.'"

This type of advertising holds radio listeners who later remember that the Stark-Davis Co. is the place to go for furnaces and furnace repairs.

"Every installation we make is a show job—one that we are proud of—and we fully live up to our claim of being the highest type of warm air experts, using the duct system developed to its finest point of perfection," declares Mr. Davis.

"Confident of our work, we therefore arrange for customers of genial, hospitable personalities, who are particularly enthusiastic about their heating plants to let us send or bring prospective customers to their homes, so that they may actually see one of our systems at work, and also feel free to ask of the owner any ques-

The four advertisements on this page are typical small-space newspaper ads used by this company. Some ads run every day; others once a week. Note the tinge of humor, the catch drawings or headings, and completeness of information despite size.

tions they wish concerning upkeep costs, service and the like.

"This is a particularly swift method of breaking down sales resistance, for once in the customer's home, the prospective patron can confirm every statement we have made regarding costs and maintenance.

"Close cooperation with the oil burner people," Mr. Davis continues, "is another factor which we consider largely responsible for our successful heating installation business.

"We do not handle oil burners, for the reason that by concentrating on warm air installations we are able to work harmoniously with all oil burner firms, who in reciprocation refer their furnace installations to us. It's a case of six-to-one. Six warm air furnace installations from prospects referred to us by six oil burner companies, as against one oil burner and furnace installation which we might make through our own individual competitive efforts."

Mnemonic

A $1.00 word meaning to remember. So REMEMBER to see the Round Oak exclusive oil burning, air conditioning system at Stark-Davis Co., 188 Fourth. $50 down, balance monthly.

The Stark-Davis merchandising plan includes more than newspaper, radio, word-of-mouth, and the advertising by oil burner concerns.

"Every one of our fifty or more employees is trained to be a salesman," says Mr. Davis.

"When a Stark-Davis journeyman is on the job, he is trained to catch anything that might lead to a sale. Each mechanic is provided with a special printed card so arranged that all that is necessary is to make a check mark besides the item in mind.

"When he turns in his time slip at the close of the day, the mechanic also hands in his prospective sales card, which is immediately placed for follow-up attention with the sales department. We then send out a salesman who rings the bell, tells the customer that he is from Stark-Davis Co., and that he is interested in knowing if the work recently performed was satisfactory. He has thus obtained an ideal opening for suggesting the purchase of other merchandise or service.

"One thing that we feel is an important factor in the development of this business," Mr. Davis informs, "is the importance with which this firm regards the customer who has already been sold. Too often, the tendency is to forget the old customer and concentrate all one's attention on new prospects. That we feel is a mistake, for it is old customers—well satisfied—who take special pains to recommend us to new patrons.

"Consequently, our sales department never forgets the old customer. We like our salesmen to call on customers at least once each month after an installation has been made, in order to make certain that everything is in good operating order, and that the customer thoroughly understands how to operate his plant.

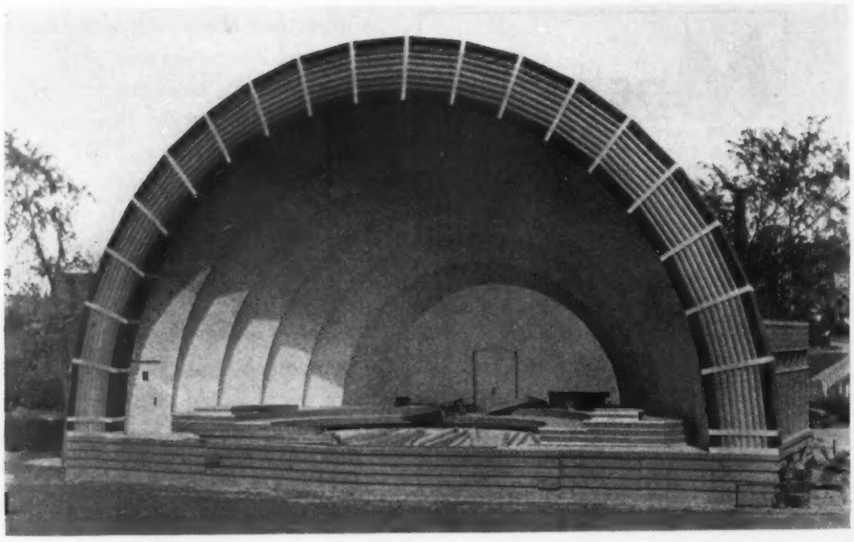
"Even people who have been sold several years ago receive periodic calls from the salesmen. The old customer may be having difficulty with his installation, through no fault of ours. Perhaps a fan or filter needs attention. A belt may be slipping, a motor may need a little oil—any of these factors being sufficient to cut down efficiency of the heating plant, and therefore make a dissatisfied customer.

"Customer and prospect problems are discussed in a sales meeting held at the store every morning. The heating plant sales

(Continued on page 48)

This is a two-column advertisement featuring air conditioning, trade in plans, oil burning, free estimates, etc. A lot of information packed into one ad.

This is one of the demonstration furnaces in the Stark-Davis store. Customers are invited in, made comfortable and given every opportunity to ask questions. The company also uses actual jobs for demonstration.



A Music Shell

This front view shows the metalled arch ring, the stepped reflecting arches and the general construction of the music shell.

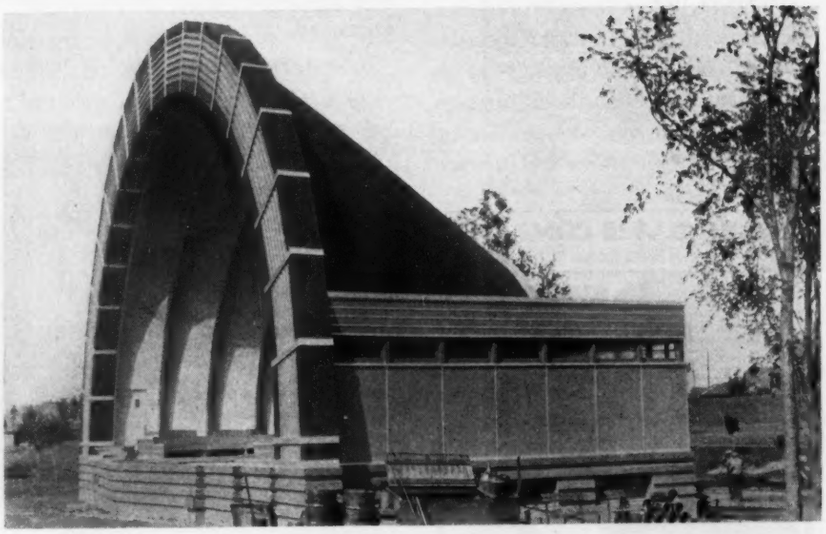
◆

MUSIC shells, or "band" shells to use the more popular term, have become increasingly popular in recent years. These interesting structures are really gigantic sounding boards, somewhat similar in function to the loud speaker of a radio, in that they amplify sound by directing the sound waves over the area directly in front of the shell and conserve sound which would otherwise be dissipated in all directions.

Because the shell must reflect sound waves and is, at the same time, subjected to all kinds of weather with little protection, these shells are excellent examples of structrues which can logically use sheet metal.

As a result, most shells are either wholly metal or use metal for sound reflection and protection against the elements. By reason of the design, which is well covered by patents, a shell offers interesting problems in fabrication as shown by the photographs and drawings of the shell in Humboldt Park, Milwaukee, designed by Clas and Clas, Milwaukee architects, and metalled by the Louis Hoffman Company, sheet metal contractors of the same city.

This particular shell was originally designed as an all metal structure, but the metal roof and metal reflectors were changed to other materials at the time of building.

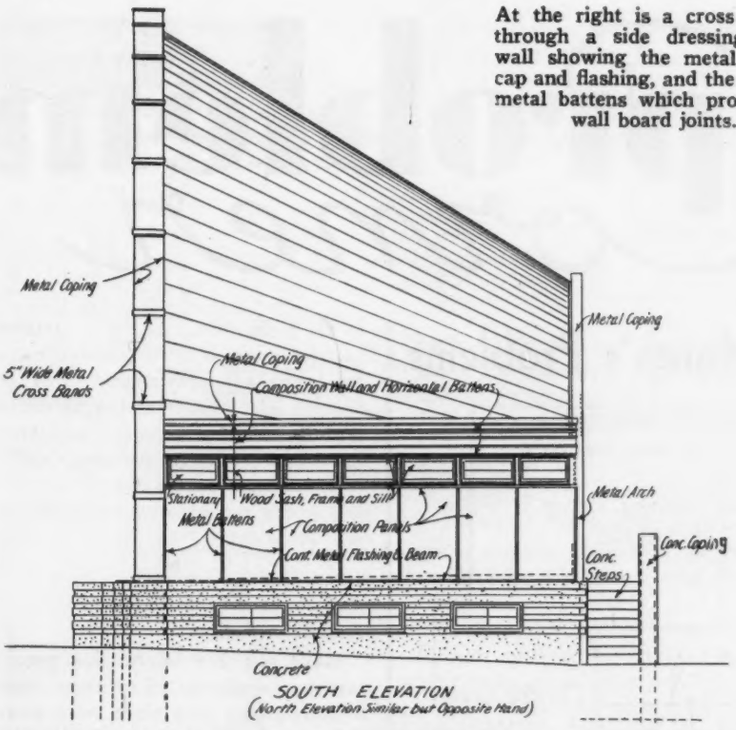


The shell proper is built within low sides and a rear containing dressing rooms. These sides are composition board held by metal battens and ornamented by metal strips around the cornice.

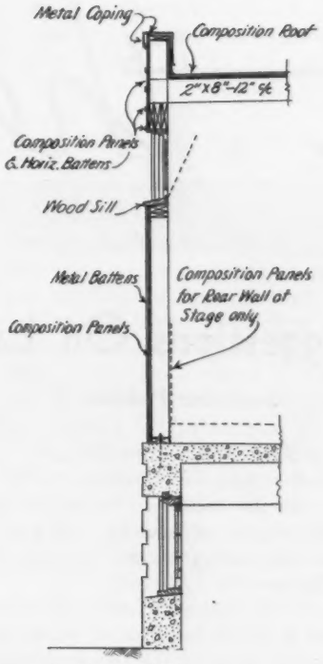
◆

A view upwards and frontwards from the center of the stage showing the reflecting arches, light troughs and lower edge of the arch ring.

The floor is concrete over storage rooms. The roof is built of continuous interlocking arched wood trusses overlaid with wood purlins. The reflecting sound arches are built up of 2 by 4 and 2 by 6-inch lumber to which is nailed the composition board forming the surface. The building as a whole is mostly wood framing protected by sheet metal as explained in the illustration. Details are discussed in the captions.

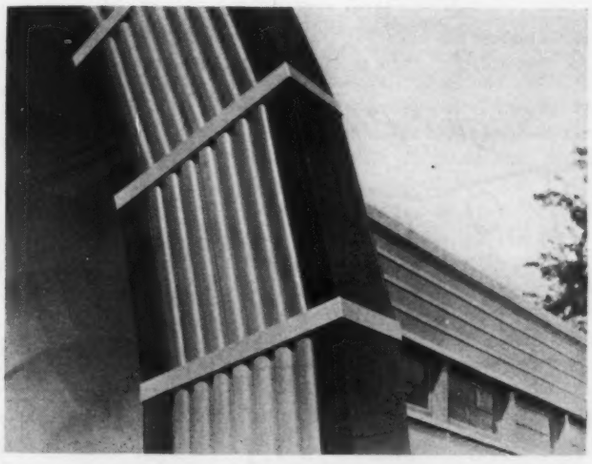


At the right is a cross section through a side dressing room wall showing the metal coping cap and flashing, and the vertical metal battens which protect the wall board joints.



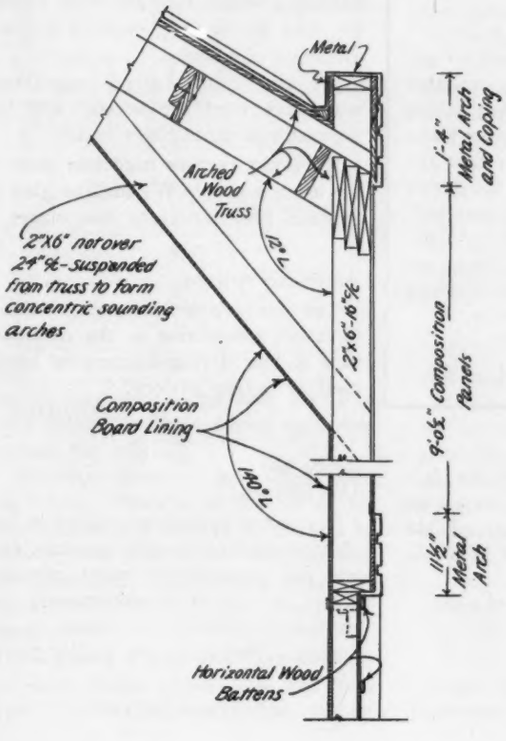
The general design is illustrated by the detail above showing the construction of the side rooms, the top of the arch and the built-up roof. Note how metal is used for weather protection at exposed joints, sills, tops, etc.

◆



Above is a photographic closeup of the arch showing the appearance and construction of the arch with the fluted face, cross bands and painted caps.

Below is a detail giving a cross section through the back wall of the stage showing the sheet metal combination coping, cap and back flashing and the formed metal band across the bottom of the concrete floor.



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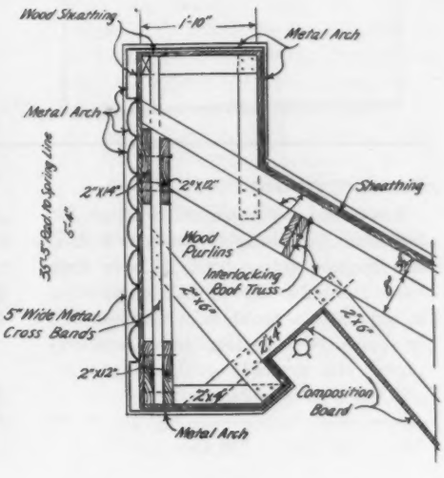
At the right is a cross section through the arch ring showing the construction of the framework and the ornamental metal facing used. The reverse flutes of the facing are formed of one sheet of metal cut to the distance between cross bands and soldered to the top and bottom caps of the arch. The fluted section and cross bands are bright metal; the caps are painted galvanized iron.



. . . the problem corner

Suggestions On Last Month's Problems

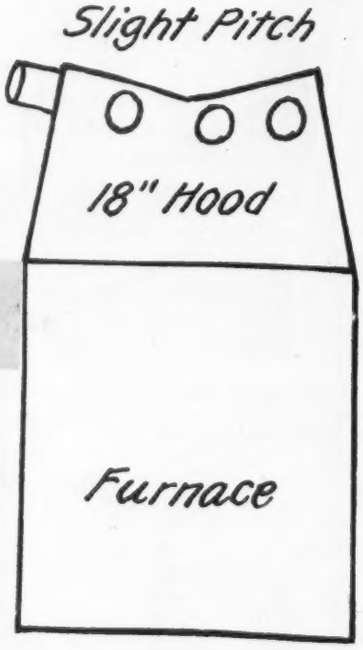
December Problem

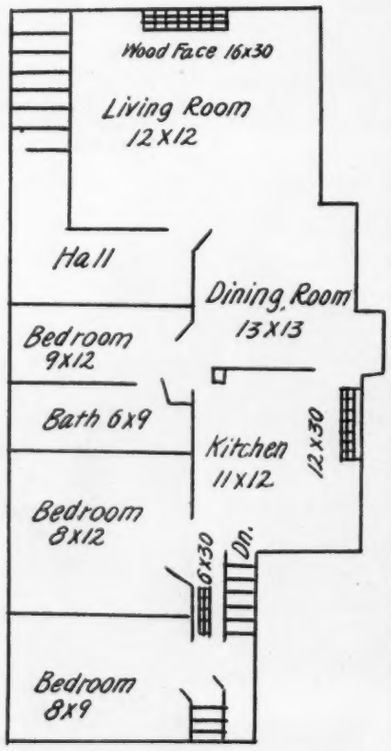
As a solution of the problem submitted by R. W. F., New York, in the December AMERICAN ARTISAN, I suggest that the hood on the furnace be raised to give at least 18 inches between the bonnet top and the top of the radiator.

Also, that the bonnet sides be pitched in slightly and that all warm air leaders be taken off the bonnet as high up as possible.

I would also suggest that the thimble in the chimney be inspected to see that there are no leaks.

As shown on the accompanying





sketch, I suggest that a cold air return be placed in the hall as indicated and be at least 10 by 30 inches in size and further suggest that three warm air faces be used, one 16 by 30 in the living room, one 12 by 30 in the dining room and one 8 by 30 in the rear hall. The cold air return should be completely boxed with all joints tight and should be connected to the furnace boot with a 22-inch round pipe.

P. Henderson,
Detroit, Mich.

American Artisan:

I received my book on "Forced Air Heating" by Platte Overton and it is the biggest dollar book I have ever had. I would like to ask a question in regard to a problem in Chapter III, on page 24, selecting inlet temperatures. His example—

$$\frac{26{,}200}{355 \times 1.07} + 70 = \frac{26{,}200}{379.85} + 70 = 69$$

+ 70 = 139 degrees.

Just what is the origin of the factor 1.07? Is he trying to strike an average between 135 degrees and 140 degrees temperature of inlet in Table B, page 25?

L. F. G., Kansas.

Reply by Platte Overton

1.07 is the factor for the density of air from 70 to 120. The factor is for the average inlet temperature or 120 degrees approximately. For 140 degrees inlet temperature it should be slightly higher or a change with every variation in inlet temperature. 1.07 is close enough for average conditions and keeps the equation from becoming unwieldy.

◆

Piece Work

American Artisan:

Have you any information regarding the installation of furnaces, pipes, registers, etc., on a piece work basis?

G. A. A., California.

Reply by The Editors

A number of contractors have tried the plan of paying mechanics on a piece work basis. Some have set up elaborate systems wherein every operation, no matter how small, are included in the schedule. Some of the largest furnace companies who install direct have also tried the plan.

Our belief is that most of these piece work plans have been abandoned because a successful piece work schedule does not seem to survive without a volume of business.

We are listing several contractors who have tried the scheme and we suggest you write them in full.

Have any readers tried this plan or are using it now? We shall be glad to forward your letters to this reader.

◆

American Artisan:

Can you give us the names of manufacturers specializing in the manufacture of hair drying helmets or hoods used in beauty parlors?

H. L. O., Ohio.

Reply by The Editors

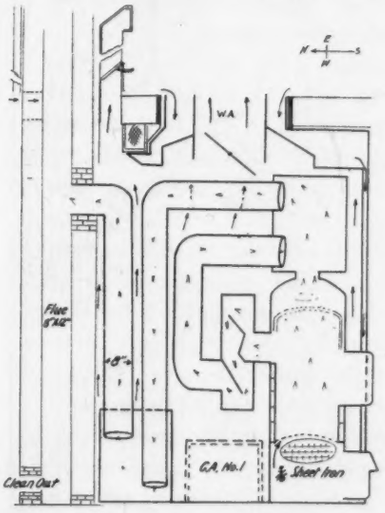
We are not familiar with this line of products and the only manufacturer we can suggest is (name mailed). There are other manufacturers, but we cannot pick out their names or addresses. Perhaps some reader might know.

Are there any suggestions?

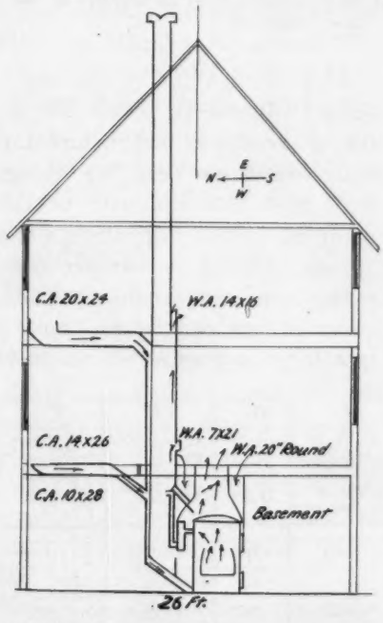
Special Furnace

American Artisan:

I am enclosing a plan of my warm air heating system built especially for the job of used sheet iron. I would like to rebuild the job—with new



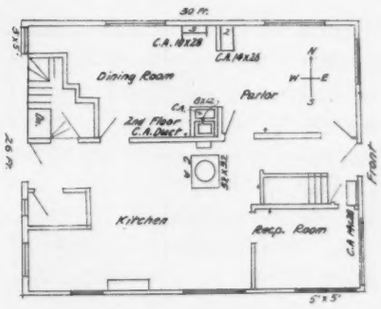
material (except furnace) and also change the warm air registers to the wall under the stairs in living and dining room. My objection to the floor registers is that dirt drops in



easily. At present the heat seems to rise to the ceiling without spreading across the rooms.

We have plenty of heat using wood as a fuel. There is no damper in the smoke pipe and the fire is checked by closing the draft door and opening the feed door. The furnace runs with draft closed about 80 per cent of the time.

As shown the second floor consists of four rooms, a bath and hall with two windows in each room except



bath which has one. Can you give me a plan showing sizes of cold air and warm air registers?

L. B., New Hampshire.

Reply by The Editors

Revamping of unusual systems may cause trouble and any suggestions made here are given with reservations.

The cold air returns seem sufficient in size and the fact that they have functioned in the past would seem to indicate that they could be left as they are.

In reference to the warm air registers, boxes, boots and size of warm air leaders, this will depend on the requirements. As exact data is missing the installer would follow the warm air code or the sum of

Glass in square feet ÷ by 12
Net wall square feet ÷ by 60 } ×9=
Cubic contents sq. ft. ÷ by 800
Area basement pipe for 1st floor runs.

The same as above, but multiplied by 6 in place of 9, for basement pipe areas for second floor runs. If the owner wishes side wall registers see manufacturers' catalogs.

The furnace is interesting, but we do not believe that the arrangement would work successfully with coal as fuel without frequent cleaning. If the draft is sufficient a high percentage of efficiency should be obtained. Unusual or "freak" furnaces often give remarkable results in individual installations, but are failures if installed indiscriminately.

◆

Removing Rust

American Artisan:

Can you tell me what to use in water to remove the rust—not a dry rust—from a large pressure tank. It has been used for soft water, but the owner wants to use the tank for drinking water when cleaned.

G. A. N., Iowa.

Reply by The Editors

Removal of rust or scale accumulations is accomplished by dissolving the rust with a rust solvent, which consists of warm hydrochloric acid to which an inhibitor has been added. The procedure is to fill the entire tank system with the rust solvent and permit it to remain from twenty minutes to what ever time is required up to about four hours, when the rust should all be dissolved.

To make the rust solvent, commercial muriatic acid is mixed with an equal volume of hot water. Commercial muriatic or hydrochloric acid is a solution of about 32 per cent hydrochloric acid gas in water and the hot water used should be of a temperature from 160 to 200 degrees Fahrenheit.

The inhibitor is used to prevent the action of acid on the metal and there are a number of commercial inhibitors on the market, which may be adapted. You can secure an inhibitor, for your purpose, from a chemical supply house by giving them instructions as to the type of metal in your tank.

◆

Licensing Plans

American Artisan:

Our association desires to have laws passed compelling all installers to be licensed and compel them to install furnaces in accordance with a recommended code such as the Standard Code or its equivalent.

We would like to know where we can get information on the plan and to get a list of any cities where this licensing agreement has been placed in effect.

H. H. P., Wisconsin.

Reply by The Editors

We attach a list of cities where ordinances covering the installation of furnaces according to a code were in effect the last time we asked about the plan.

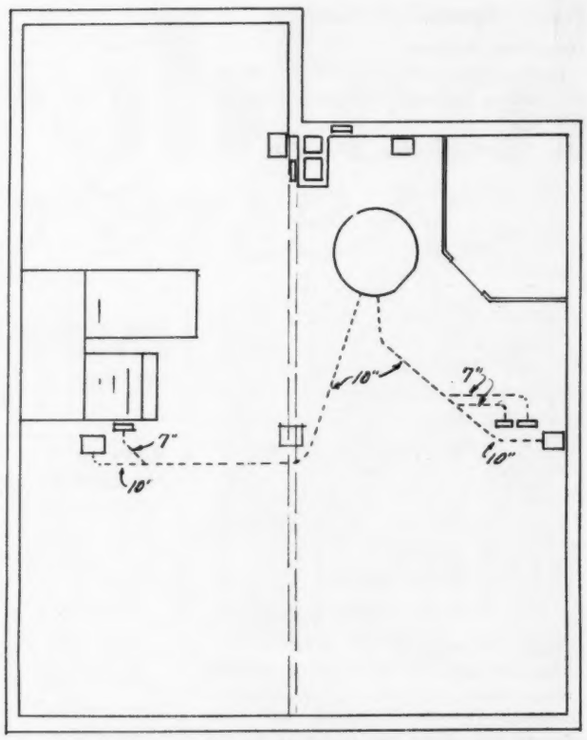
How many of the towns are operating under a licensing agreement or are installing under a code we do not know. The towns we have on file are as follows—Omaha, Nebr.; Columbus, Ohio; Cincinnati, Ohio; Youngstown, Ohio; Los Angeles; Minneapolis, Indianapolis, Ind.; Fort Wayne, Ind.; St. Louis; Seattle; Greensboro, N. C.; Pittsburgh; Louisville, Ky.; Chicago.

Will readers in these cities let us know if their agreements are still in operation; how they are working out; whether or not all installers are licensed; how much the license or fee costs; what qualifications must an installer meet, etc.

We should also like to hear from readers operating under codes in cities other than the ones listed.

Last month we suggested some methods for cleaning old leaders and stacks. The next step is to balance the system for required air delivery. Did you ever have your remodeled system thrown out of kelter by an owner? If so read this article which gives—

Some Practical Ways To Permanently Balance Old Gravity Pipe Systems



The ingenious contractor will utilize as much of the old piping system as possible. Perhaps this will mean using old pipe sections or making too large pipes serve as trunk lines cutting smaller round pipe into them. Such a plan is shown here with the two old 10-inch pipes used as trunks for two new branches.

EVEN after a damper is locked in its proper position so that air pressure within the duct will not shift it, the air distribution may be thrown out of balance by the user of the plant tampering with the damper settings. This trouble is not so frequent on completely new systems where the ducts are at least approximately of the sizes required for mechanical heating, but wherever old gravity-size pipes are used the heating contractor should try to guard against service calls resulting from some of the bright ideas that induce the user of the plant to meddle with adjustments of dampers.

Table No. 3 shows that the Bath requires a pipe 4.2 inches in diameter and the Sewing Room requires a 6.5-inch pipe for mechanical heating, yet each of these rooms has an 8-inch pipe. Even if we set the dampers so as to deliver 43 c.f.m. to the Bath and 107 c.f.m. to the Sewing Room as required by our calculations (Column II, Table No. 3) the chances are that before the first winter is very far along, we'll find that the user of the plant has entirely unbalanced the air distribution by damper tampering and we may find the Bath

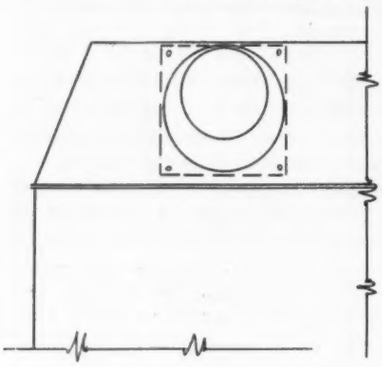


Fig. 6 Left—One way to choke down an oversized run so that the pipe will get its volume of air regardless of how the owner may tamper with the damper is to place a plate like this inside the bonnet. The hole is sized for the air volume wanted.

Table 3 shown here gives in chart form all the information for the house we are working in. This is not a data sheet, but rather a working plan for the supply system.

◆

TABLE NO. 3

	I	II	III	IV		V	
	Room	C.F.M	Duct	Round Pipe		Register	
Room	Basic Factor	Measured at Room Temp. of 70 Degrees	Area Sq.Ins.	No.	Diam. Ins.	No.	Free Area Sq.Ins.
Living	22.21	242	78	2	7.0	2	67
Dining	9.69	106	34	1	6.6	1	58
Kitchen	11.85	129	41	1	7.3	1	71
Bed #1	8.24	90	29	1	6.1	1	50
Bed #2	8.24	90	29	1	6.1	1	50
Bed #3	8.66	94	30	1	6.2	1	52
Sewing	9.78	107	33	1	6.5	1	59
Bath	3.96	43	14	1	4.2	1	24

getting double its quota of warm air while the Sewing Room is getting less than half of the heat it requires.

One of the most effective ways to guard against trouble calls that result from such unwarranted tampering, where the original gravity piping is to be used for forced air heating, is to reduce the gravity casing collar opening to approximately the free area which the calculations show will be needed for mechanical circulation. This is most easily accomplished by the use of a galvanized iron plate large enough to cover the original casing collar and having a circular opening of the approximate diameter of the calculated size of round pipe needed for mechanical heating. This plate (Figure 6) is attached to the inside of the hood by means of bolts or metal screws.

These restricting plates in the original casing collars not only guard against unbalancing of the plant by changes in damper settings, but they also help to keep the air flow balanced when the blower is not running. This can best be understood if we first consider what conditions exist in a straight gravity system that is out of balance.

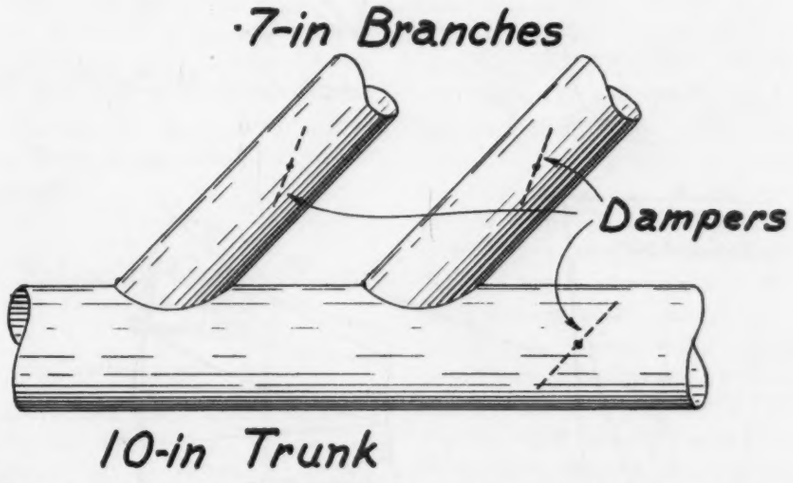
Suppose, for the sake of illustration, that the original gravity plant in the house we have been considering had only one 18-inch cold air return instead of two. The user might tell us, if we were called to remedy the trouble in gravity heating, that the Dining Room, Kitchen, Bed Room No. 3 and Sewing Room "robbed" the other rooms. We would probably explain to him that there was "a shortage of cold air supply to the furnace" and that since not enough cold air was being supplied to the furnace to fill *all* the warm air pipes, the shortest and most direct runs which offered least resistance to air flow, would naturally rob the longer runs.

And our suggestion for balancing up such a gravity plant would be to add another return air duct so as to supply *enough* air to the furnace to fill *all* the warm air leaders. But so far as merely balancing the system is concerned and without regard to the efficiency of the plant, the same effect could be accomplished by reducing the sizes of all the warm air leaders. It wouldn't make an ideal installation for gravity operation, of course, because the small volume of air flowing (the capacity of one 18-inch pipe) would necessitate high register temperatures, but at least it would *balance* the air flow and *air would be delivered* through all the warm leaders.

In a mechanical system, on the other hand, these small leaders would not necessitate a high register temperature because the forced circulation would insure delivery of even a greater volume of air than normally flows by gravity and would thus cut the register air temperature down below that of a Standard Code gravity job.

In tests made for and reported in the AMERICAN ARTISAN by Platte Overton, it was found that with a plant having 6-inch supply ducts throughout, the distribution of air to the rooms and uniformity of room air temperatures when the blower was not running, was better than when larger ducts were used.

The reason will be apparent when we consider that even a blower especially built for use with a warm air furnace, retards gravity flow to some extent when it is not running. Since the volume of air flowing by gravity through the blower is less than that needed to completely fill all the gravity-size leaders, it is obvious that the reduced air volume available at the bonnet, will tend to flow out through the larger or the shorter pipes—through those pipes, in fact, which for any reason offer least resistance to air flow.



When new branches are cut into old leaders a damper should be placed in both branch and continuation of the leader as shown here. Locate this damper at some little distance from the throat. A suggested plan for cutting in the branches is also indicated.

In the job we are considering, the two 10-inch runs to the Dining Room and Kitchen and the two 8-inch runs to Bed Room No. 3 and the Sewing Room, have an aggregate area of $(2 \times 78) + (2 \times 50) = 256$ square inches and it may easily take all, or nearly all, of the air which will be delivered to the furnace through the blower when it is not operating, to fill these low-resistance runs. Consequently the longer pipes to the front of the house get practically no air except when the blower is running.

Now suppose we restrict all the original casing collar openings to

(Continued on page 25)

Pattern For a Twisted Vase

For A. Johnson, South Tacoma, Wash.

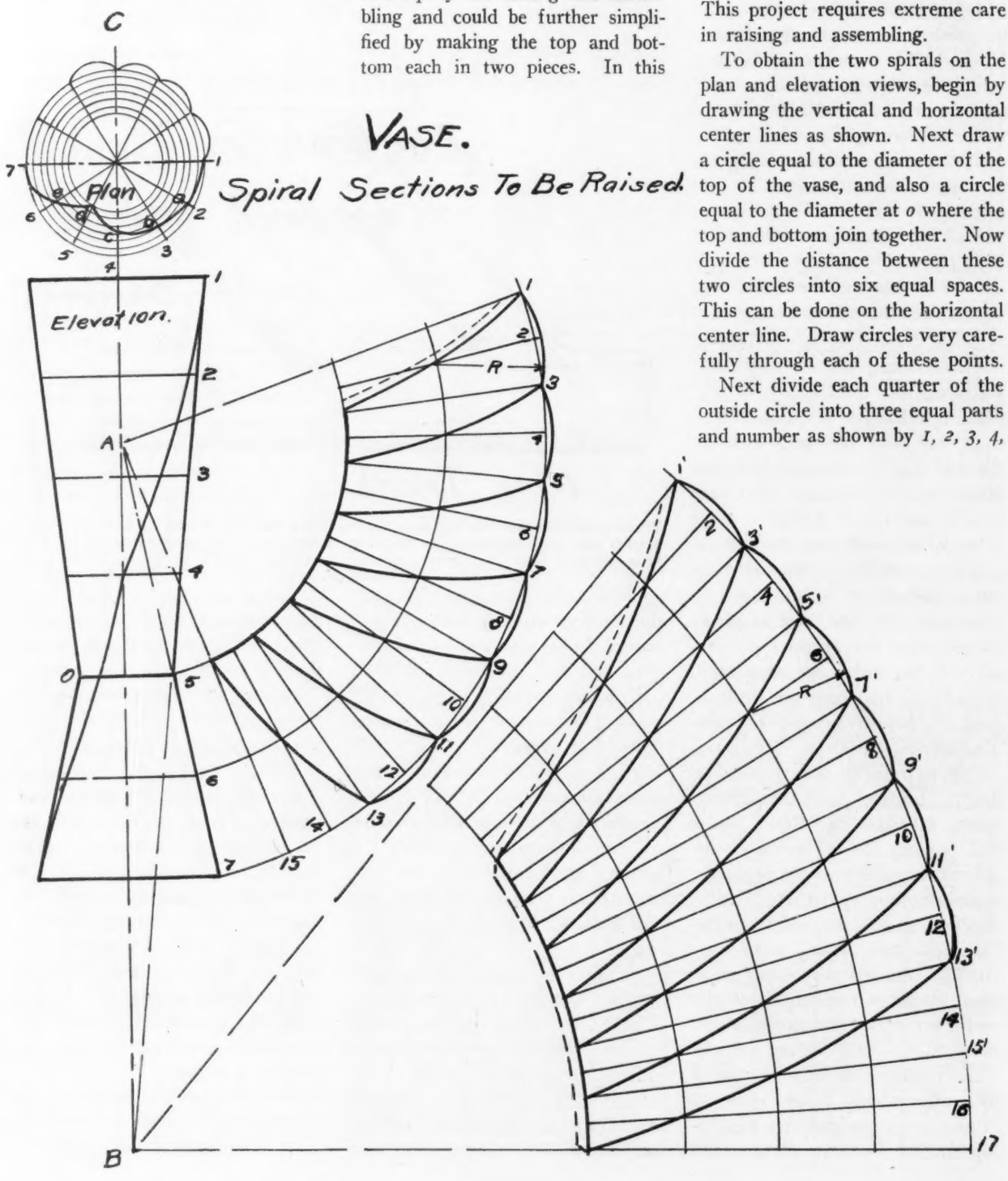
By L. F. Hyatt
Contributing Editor

THE six sided twisted vase shown here is extremely interesting. The gores are to be raised and travel spirally from the top of the vase to the bottom as shown by the line of the elevation view. Each of these travel half way around the vase in going the full length.

The vase is made in two pieces to simplify the raising and assembling and could be further simplified by making the top and bottom each in two pieces. In this case there would be three gores in the half upper and half lower parts. This project requires extreme care in raising and assembling.

To obtain the two spirals on the plan and elevation views, begin by drawing the vertical and horizontal center lines as shown. Next draw a circle equal to the diameter of the top of the vase, and also a circle equal to the diameter at *o* where the top and bottom join together. Now divide the distance between these two circles into six equal spaces. This can be done on the horizontal center line. Draw circles very carefully through each of these points.

Next divide each quarter of the outside circle into three equal parts and number as shown by *1, 2, 3, 4,*



5, 6, 7, and draw lines from each point to the center. The spiral is drawn through the intersection of the outside circle and the line from point *1*. The line from point *2* intersects the second circle at *a*, the line from point *3* intersects the third circle at *b*, and so on as shown.

Now draw the elevation of the vase and step off six equal spaces on the vertical center line. Draw a horizontal line through each of these spaces as shown. To find the spiral line in the elevation view, a vertical line is dropped from the points *a, b, c,* etc., found on the spiral line in the plan view. Then this line intersects the horizontal lines *1, 2, 3, 4,* etc., locating the points through which the center line of the spiral on the elevation view is to be drawn. Draw the spiral line.

To develop the pattern for the base first extend the line *7, 6, 5* on the elevation view so as to intersect the center line *C-B* at point *A*. Now with radii *a-5, a-6, a-7,* and *A* as a center strike arcs of indefinite length. On the arc drawn from point *7* step off fourteen spaces equal to the spaces *1, 2, 3,* etc., found on the plan view. Number these spaces as shown on the pattern for the base.

Since the raised parts travel spirally down through the three horizontal lines on the base they will travel spirally on the pattern from point *1* on the pattern through the point of intersection of *2* and *6*, then to the intersection of *3* and *5*.

It is important that the line through all of the succeeding points be identical in curvature with this line, and of course drawn in the same manner.

It will be necessary to make some allowance for the flaring of the gores at the base. For this the radius *R* is used in striking the arcs. These, of course, may vary by the amount of hammering required in doing the raising. If the work is done by hand extreme care is necessary.

To obtain the pattern for the top part of the vase the procedure is of course the same. Begin by extending the line *1, 2, 3, 4, 5,* until it intersects the center line *B-C* at point *B*. With radii equal in length to *1-B, 2-B, 3-B,* etc., strike arcs of indefinite length as shown.

Now step off the sixteen spaces equal to any of the spaces found on the plan view *1-2, 2-3,* etc. Here again the first line is drawn through the points of intersection of radial line *1* and arc from point *1*, radial line *2* and arc from point *2*, radial line *3* and arc from point *3*, etc. It is necessary again to be careful to have the curvature of all the lines identical. An allowance is added as shown by the dotted line for the lap seam.

To draw the arcs at the top use the *R* radius in the same manner as was done with the base. An allowance may be made for joining the upper and lower parts together as shown by the dotted lines on this pattern.

Balancing Gravity Pipe Systems

(Continued from page 23)

about what they would be for a regular mechanical system, by means of the restricting plates. The openings in these plates can be cut to the nearest half-inch of calculated diameter and the openings into the low resistance runs would then be:

Dining Room	6.5-in.	= 33 sq. in.
Kitchen	7.5-in.	= 44 sq. in.
Bed Rm. No. 3	6.5-in.	= 33 sq. in.
Sewing Room	6.5-in.	= 33 sq. in.
Total		= 143 sq. in.

Thus, with the restricting plates installed across the original collar openings we have reduced the aggregate free outlet from the hood into these low-resistance runs from 256 square inches to 143 square inches—a reduction of 113 square inches or 44 per cent, which helps greatly to "balance" the system for gravity flow.

Even if it is decided not to install new piping, it will sometimes be found after the old pipes have been taken down for cleaning, that some are not in usable condition. In replacing them, the sizes calculated for a mechanical system might as well be used—had better be used, in fact. There's no particular objection to having some pipes of gravity size and some of the smaller mechanical heating size, in comparison with having all of them of gravity size, because presumably, the old gravity pipes will be equipped with restricting plates at the hood collars and all ducts will have lock dampers for more precise balancing of the air flow.

These new ducts may be either complete individual runs from the furnace to the register or to the stack boot, or in many cases, they can be considerably shortened by using one of the old gravity leaders as a trunk and attaching these new runs as branch ducts. As an example, suppose there is found to be a shortage of 8-inch pipe which is in usable condition. The present 10-inch run to the east register in the Living Room may be used as a trunk line to supply that register and the wall stacks to Bed Room No. 2 and Bath.

Table No. 3 shows that the calculated duct areas required, are as follows:

Living Room		
(E. Reg.)	39 sq.in.	= 7.0-in. pipe
Bed Room		
No. 2	29 sq.in.	= 6.1-in. pipe
Bath	14 sq.in.	= 4.2-in. pipe
Total	82 sq.in.	

According to the "percentage reduction method" of determining the trunk line area required to supply branches as given in Article 2, Section 5-(b) of the Mechanical Heating Code (Third Edition), the area of the trunk required to supply these branches will be 90 per cent of 82 square inches, or 74 square inches.

(A word of caution: The cal-

(Continued on next page)

culated area of 14 square inches was used for the Bath, but until one has had some little experience with mechanical heating systems, it is much safer for him to use nothing smaller than 5-inch pipe, and to make the corresponding area, 20 square inches, the least he will use in his calculations. Thus instead of using 14 square inches as the required area for the Bath, 20 square inches would be used and the total of the three branches would then be 39 + 29 + 20 = 88 square inches. The trunk to supply these branches would be 90 per cent of 88 square inches, or 79 square inches.)

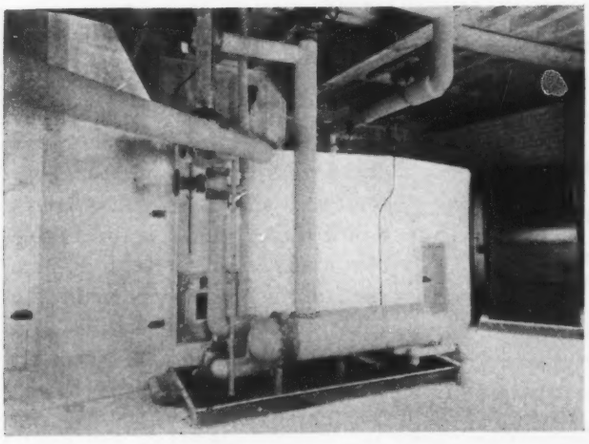
In either case, a 10-inch round pipe is large enough to supply these three branches.

So much for the calculated sizes. In practice, it's just as well to continue the 10-inch trunk all the way to the Living Room register and to use one size of pipe for the branches. Each branch in this particular case, may as well be 7-inch as that size is the largest needed. Then a lock damper in each branch and in the main trunk between the last branch connection and the Living Room register (Figure 7) will permit regulation of the air delivery to the several rooms supplied by the improvised trunk.

In a like manner, the 10-inch leader originally supplying the west register in the Living Room can be made into a trunk to supply that register and the wall stack leading to Bed Room No. 1. Thus two 10-inch pipes leaving the furnace take the place of five such pipes in the original plant.

Fabricating and Installing Methods

(Continued from page 12)



One of the two conditioning units for the exhibition hall. This unit is located in the attic. The construction of the housing is explained in the article.

of the long vent runs required, mechanical withdrawal of the air is provided for by means of fans which pull the air through the galleries and discharge it into the fan room.

The duct system for the exhibition hall is unusual in design as shown on one of the details. There are four lines of ducts through the hall occupying four of the eight bays in the room.

The auditorium floor above the exhibition hall is carried on reinforced concrete girders and beams so in each duct bay the lower flange of the auditorium floor beams is plastered across to form the upper side of the air duct. A duct 21½ inches deep and 21 feet wide is then formed by plastering the sides of the bay for 21½ inches below the plastered ceiling to form the sides of the duct and making the bottom of 20-gauge galvanized iron hung on supporting rods as shown in the detail. This design made it necessary for the sheet metal contractor to furnish only the bottom of the large ducts. The angle supports for the galvanized iron bottom are 2½ by 2 by ¼-inch angles placed 25 inches apart. Some 1100 ⅜-inch support rods were required for these duct bottoms.

As shown on the detail, the air passes through these iron-plaster ducts from one end of the hall to the other. In order to divert the air evenly through the lighting fixture openings a galvanized iron box (one side hinged with the opposite side open) was fabricated and placed above each fixture opening. The side of the box away from the direction of air flow has a counter weighted damper connected with a pull rod When the damper is released it falls down against the bottom of the duct thus permitting most of the air flowing through the duct to pass over the opening. If air is wanted through the fixture the damper is pulled upright thus affecting a stopper which causes air to flow through the opening. Part or all of the hall can thus be subjected to ventilation.

All sheets for the duct bottom were fabricated on power brakes in the Richards' shop and were so formed that the sheets would slide together as shown on the detail of a duct joint.

Housings

As shown in the photographs, each of the seven conditioning units requires considerable housing for the filters and coils. For these housings an angle iron frame was constructed with the angles placed about 2 feet on centers. Flat sheets were then riveted to the angles so that no raised seams are used on either the inside or outside of the housing. These flat surfaces were then painted white as shown on the photograph of a unit, resulting in an equipment room highly presentable in appearance.

Air Conditioning Section

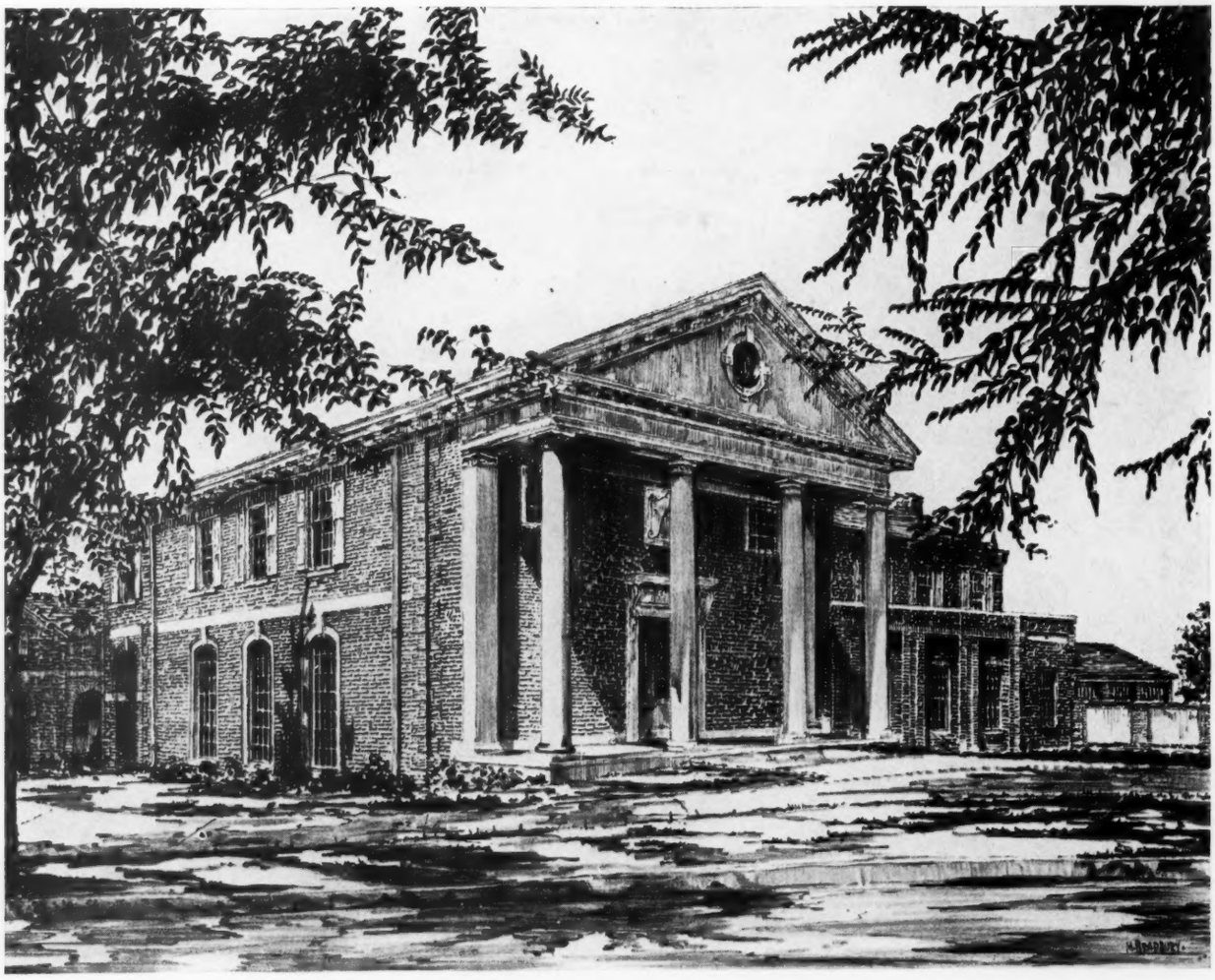
Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

AS TIME goes on we are more firmly convinced than ever that air conditioning contractors have just two courses open to them.

- - - - Either they must know enough engineering and have sufficient experience to be able to design, install and trouble-shoot most or all of their installations, or else they must depend absolutely on the manufacturers for day after day help with big and little problems.

- - - - Under present conditions it doesn't seem possible to have a job go in and run without dozens of petty and important problems bobbing up. When the contractor can't trouble-shoot, he loses headway.

- - - - The chief purpose of this air conditioning section is to cover as many phases of air conditioning as possible to aid contractors in understanding what conditioning is all about.



Kingsport Utilities Co., Kingsport, Tenn. Allen N. Dryden, Architect; General Contractor, Fiske-Carter Co.; Air Conditioning Contractor, Cooling and Air Conditioning Corporation; Heating Contractor, Hynes Electric Co.

■

AMERICA'S FIRST ELECTRICALLY HEATED AIR CONDITIONING INSTALLATION

TO insure perfect operation the Minneapolis-Honeywell Modutrol System was selected to control the comfort cooling, heating and air conditioning in America's first electrically heated air conditioning installation. A properly balanced and co-ordinated system of controls regulates the electric strip heaters which preheat air before it is passed through the ventilating ducts, while in the summer months, a transfer switch enables fresh, cooled air to be circulated . . . The Modutrol System is suitable for comfort cooling, in old buildings or new, large or small. Every component unit is perfectly co-ordinated to furnish accurate and efficient control, under any condition. Consult the Minneapolis-Honeywell engineer to assist in selecting proper control equipment for your next job . . . Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota . . . Branch or distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL

Control Systems

Automatic Controls

So far in this series the fan has been controlled by a bonnet instrument; the fire by the room thermostat; or, as in hookup 3, the instruments were inter-wired. Now we begin discussion of a different arrangement whereby the fan is controlled by the room thermostat and the fire by a bonnet instrument with no electrical connection between the two circuits. It is called "keeping heat on the shelf." Sounds interesting? But what does it do? This article and the next tells all about it.

IN the three automatic control hookups discussed to date, each control system has been based on the theory that the room thermostat should control the fire while the fan should be controlled by a bonnet instrument. We have also pointed out the advantages of a fire or limit control, either in the bonnet or in the stack, so set that the draft is closed when the bonnet or stack temperature reaches a pre-determined temperature. This limit control serves to keep the fire and bonnet air temperatures from running away and producing needless heat.

It has been pointed out that the real reason for any control system is to give the owner the satisfaction and comfort he pays for at as economical a cost as possible. What are the things the owner wants?

He wants uniform temperatures throughout his house. He wants the heating plant to cost as little for operation as possible. He wants the system to operate satisfactorily in all kinds of weather.

Immediate Heat Delivery

One important psychological function is not mentioned in the desirable features enumerated above. That psychological function is—when heat is needed or wanted it should be delivered immediately.

Consider this again. When heat is needed or wanted it should be delivered immediately. If the apparatus (furnace, piping, controls, fuel) which have been installed are slow in responding to the need or desire for heat, then our system falls down badly on one characteristic which the owner consciously or unconsciously expects from his new system.

How can we get heat quickly. We naturally say our fire must pick up rapidly. Or our furnace must heat up quickly or must hold heat for a long period so the fan can start as soon as the thermostat calls for heat. Or, we should use some quick generating fuel like oil or gas.

But the simplest method is to have heat in the bonnet at all times so that the fan never has to wait on the fire.

This idea is not entirely new. Contractors all around the country have tried it out with varying success. It has been tried out in several variations at the Research Residence in Urbana. We can, then, look over available information and ascertain just how good or bad is this idea.

Contractors who have tried out the system call it—"Keeping heat on the shelf." Up to this point the idea sounds excellent. What do we actually know about the idea?

This control system requires changes in our arrangement followed to date in that the room thermostat starts and stops the fan and does nothing else, while the fire is controlled by a bonnet or a stack control which maintains a pre-determined range of temperature in the bonnet.

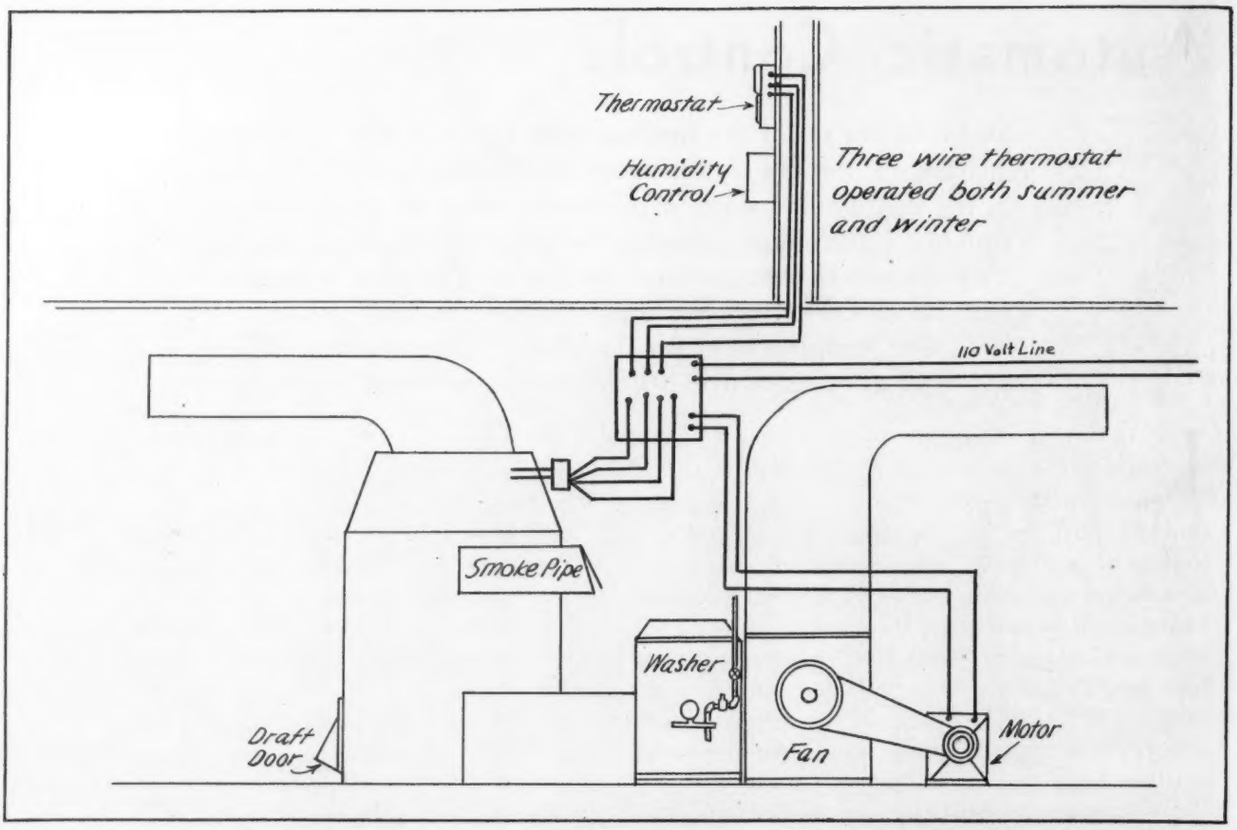
Two Variations of Hookup 4

There are two variations to this basic plan. In both variations the bonnet air temperature is maintained regardless of whether or not the room thermostat demands heat. The second variation differs from the first in that the room thermostat starts and stops the fan while the bonnet air temperature is maintained within pre-determined temperatures by a bonnet control, as variation one, *but the fan in this second variation cannot run when the damper is open.*

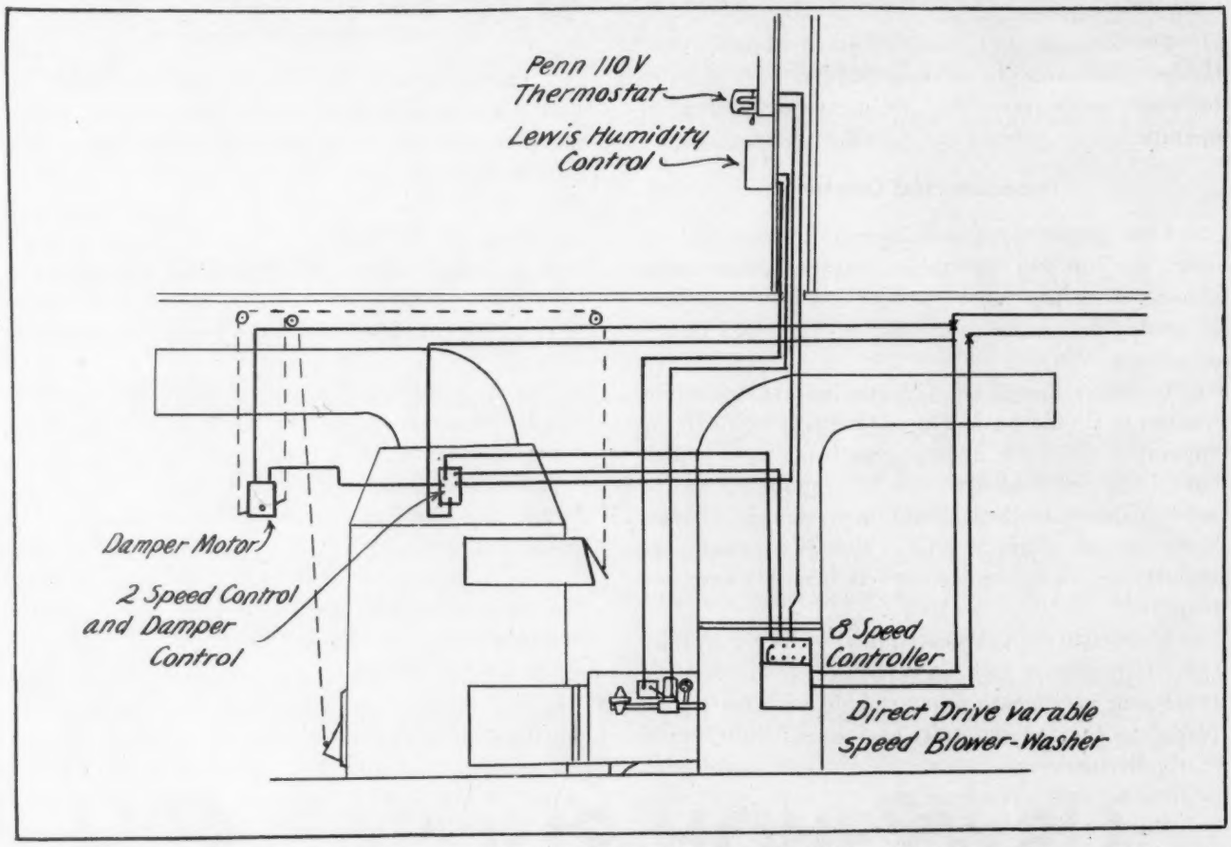
It is important that this difference be kept in mind. In variation one the fan runs as long as the room thermostat is not satisfied regardless of the temperature of the air which it blows up into the house and the fan can run whether the draft is open or closed.

In variation two the casing air control keeps the bonnet air temperature within predetermined temperatures, but the fan does not run when the draft is open.

For variation number one there is a further refinement possible; namely the use of a second bonnet control or a limit control in the stack which is wired in series with the room thermostat preventing the fan from running when the bonnet air temperature is too low, but which has no electrical connection with the draft control thereby making this



In this layout, using Cook Electric Company apparatus, the control unit houses damper motor, transformer, relay for blower motor, and a panel to which all wiring is brought. The bonnet instrument is a warm air furnace switch which may be set to maintain a pre-determined range of temperature in the bonnet. The purpose of this hookup is to keep warm air in the bonnet at all times so that when the room thermostat calls for heat the fan starts immediately



Peerless Electric Company, whose apparatus is shown above, say hookup No. 4 will cause room temperature overrun in mild weather with coal. The system above has the dampers under direct control of a limit switch wired into a two speed fan control so damper will close at low setting. The blower operates continuously with the high speed off the room thermostat. When room thermostat calls for heat the fan runs on high speed only when bonnet temperature is up to high setting. When thermostat is satisfied fan reverts to low speed.

system different from system three discussed in our October, November, December hookup.

The operating characteristics of variation number one are as follows: The room is cooling so the thermostat calls for heat. As soon as contact is made by the room thermostat the fan starts. Since the fire control has maintained a pre-determined bonnet air temperature the fan blows this air into the room immediately. As soon as the fan starts the air in the bonnet starts dropping in temperature, but the fan continues to run regardless.

It is apparent, therefore, that the results obtained from variation one are mainly dependent on the control of the fire because if our furnace can not keep the bonnet air temperature up to our desired setting the fan will blow cold air into the rooms.

Is This Hookup Practical

As students of control systems we naturally want to know whether it is possible for such a system to operate satisfactorily as we have planned it. Going back to the facts we have established for the other three systems, we first set our controls at ranges we previously found satisfactory. We appreciate the importance of operating at as low a range of air temperatures as possible so if we have designed for a register air temperature of about 140 degrees and if we do not have excessive temperature loss in our ducts we will set our bonnet air control to maintain a temperature range of about 120 to 150 degrees.

Using this range, our draft will open every time the bonnet air temperature drops to 120 degrees and will close when 150 degrees is reached. By trial we determine if this range is wide enough, also if the high setting is high enough. We decide by taking temperature readings at our registers and if we find that our fan blows air below 120 degrees we must make further adjustments.

We may try first of all to raise the whole range say from 120-150 to 130-160 degrees thus maintaining the same differential. We may find that with this change we get first blasts of air at a temperature higher than our designed register air temperature ending with air at 130 or even lower if our furnace cannot maintain the temperature range we have selected. This indicates that the furnace cannot produce heat as rapidly as we withdraw it which is serious in this hookup since the fan runs regardless.

Or we may find that we do not need to raise the temperature range and that our register readings show a temperature above our low setting and above our register air temperature thereby indicating that our furnace is able to produce heat as rapidly as the fan exhausts it. Under this condition we may lower the high setting if we desire or we may cut down the differential. Cutting down the differential means a more even fire condition because our draft will open and close more frequently never letting the fire accelerate for long periods.

The most important advantage of this system is the fact that the fan starts immediately, thus providing the owner with the response he hopes for. With a responsive furnace and fire and proper settings of the controls we maintain an even combustion rate—never very low and never very high.

Some Disadvantages

However, in considering our hookups we should also give consideration to the disadvantages of the hookup. Variation one has some apparent disadvantages. The most obvious disadvantage, we believe, is the fact that the system requires frequent alteration in accordance with outside weather. For example, let us say that we have set our fire control for a range of 120 to 150 which is found to be satisfactory for cold weather and the system enters a period of several days when the temperature stays above freezing. It is apparent that a fire maintained high enough for below freezing will produce too much heat for mild weather and if the owner does not set his fire control down more fuel than necessary will be consumed. In as much as the fan will not run while the house thermostat is satisfied, this surplus heat will be given off to the basement and may result in over-heating the basement.

A second disadvantage is the fact that any rooms which have gravity action will be over-heated during periods when the fan does not run. In as much as it is practically impossible to tell before hand which rooms will have gravity flow there is little chance to control this gravity overheating without throwing the forced air system completely out of balance by shifting dampers to control gravity action.

Another factor which must be considered if this hookup is used is the action of the fuel and the fire. If our fire control is properly set we will have frequent openings and closings of the draft door thus maintaining combustion at a constant level. However, if the fire is not responsive or the owner lets his fuel bed decrease or the furnace does not produce heat as rapidly as the fan withdraws it, this hookup will permit cold or cool air to be blown into the rooms. Therefore, the contractor must establish a setting of the fire control which prevents this passing of cool air and still does not produce more heat than required under different weather conditions. Obviously this is bound to be a delicate balance and because each system so controlled must have considerable experimentation this hook up is not so desirable as some of the others we have described.

Air temperatures in all leaders are recorded by high temperature thermometers inserted at several points along each leader. This test is to determine temperature losses under fan and gravity flow.

Gravity Operation of 6-in., High Velocity System in A. A. Test House No.1

By
Platte Overton

IN publishing data on the various test houses under way this winter, we have had frequent letters from contractors asking for information on the action of the small individual leader pipe, high velocity systems under gravity flow.

Many of these letters express opinions to the effect that this idea falls down when gravity operation is needed. In answer to these letters a test run covering one day was arranged. However, because this system is primarily a mechanical installation we do not think it fair to run the system on gravity for a full 24 hours. We know without testing that with the system balanced for mechanical operation there will be rooms which are chilly or cold on long gravity operation.

The test as run gives, we feel, a fair judgment on the operation by gravity.

The date of the test reported here was Feb. 21, 1934.

Duration of test: 14 hours (6:00 a.m. to 8:00 p.m.)

Mean outside temperature for 14 hours: +21.5° F.

Prevailing winds: from southwest; velocity 5 miles per hour.

Sunshine: 7:45 a. m. to 4:30 p. m.; overcast: 4:30 to 8:00 p. m.

Type of fuel used: Bituminous nut.

B.t.u. per pound: 11,700 (Fuel office report)

Fuel burned: 100 pounds.

Fuel burned per hour: 8.58+ pounds.

Combustion rate per sq. ft. of grate per hour: 1.77 lb.

Temperature average of 13 rooms: 74° + F.

Temperature flue gas at furnace (average): 435° F.

Bonnet stat: set at 175 degrees.

Draft in smoke pipe (check open)—.07-.08 inches.

Draft in smoke pipe (check closed)—.14-.15 inches.

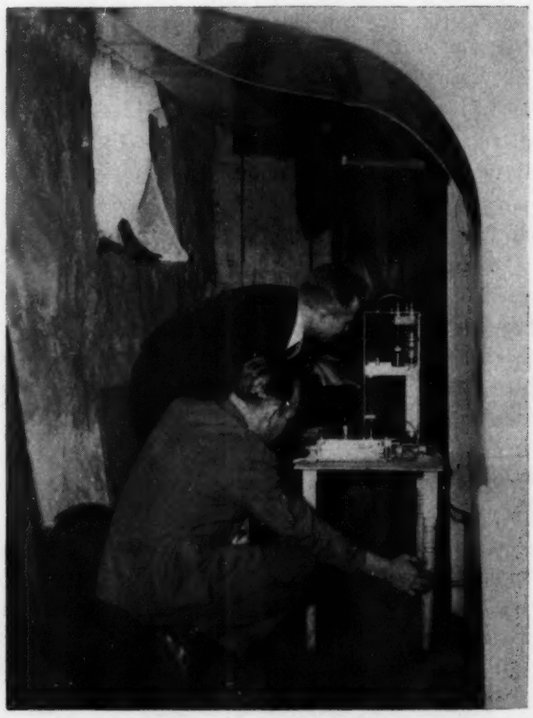
Static pressure loss (discharge side of fan)—.05 inches.

Static pressure loss (intake side of fan)—.05 inches.

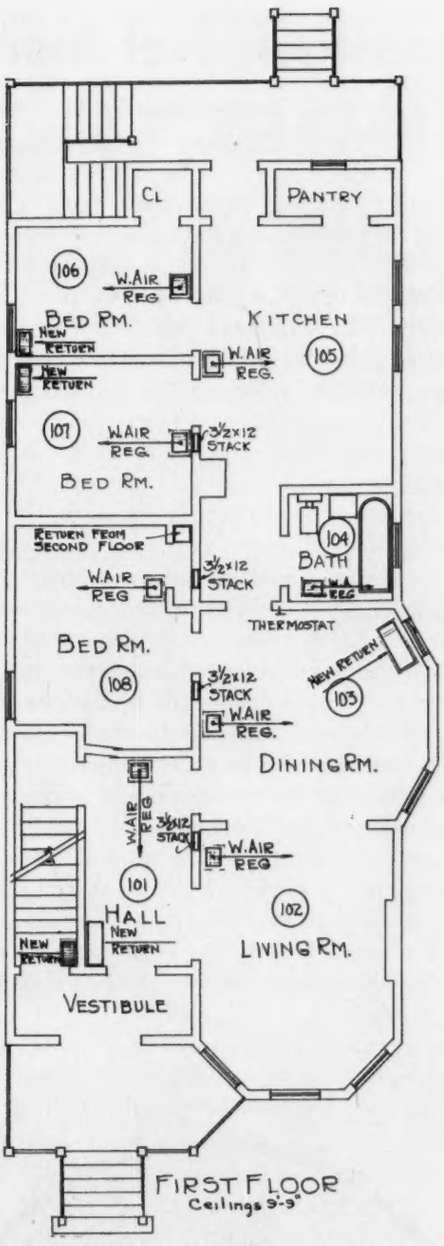
Total pressure loss—.10 inches.

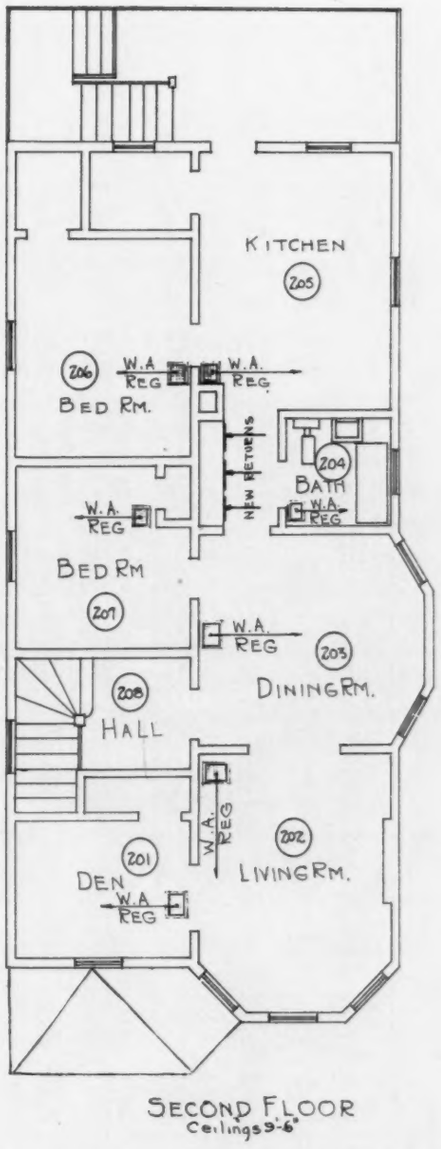
No action of fan from 12 noon to 4:25 p. m.

Relative humidity: Lower floor—30%.



All pressure losses are carefully taken under all conditions and recorded. The engineers are taking a flue gas analysis and draft gage reading for the static pressure loss. Some interesting gas analyses relating to size of heater to fuel efficiency have been discovered.





Relative humidity: Upper floor—28%.
Thermostat set at 73° F.

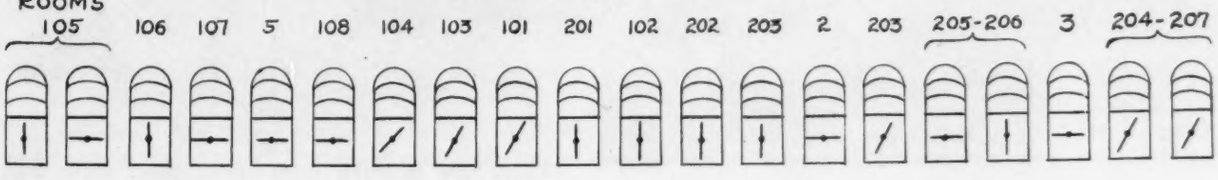
A large number of inquiries regarding the system in the American Artisan test house concern the gravity service, or that period when the fan is idle. The accompanying data sheet was charted from a gravity test conducted February 21 between the hours of 12:00 noon and 4:25 p. m.

The test on this date finds our test house with some changes in the construction and the heat loss factors. The rear porch had been completed and glassed in. Storm sash had been placed on the windows in rooms 201-202-203. The lower sash in rooms 102-103-105 now have weather strip.

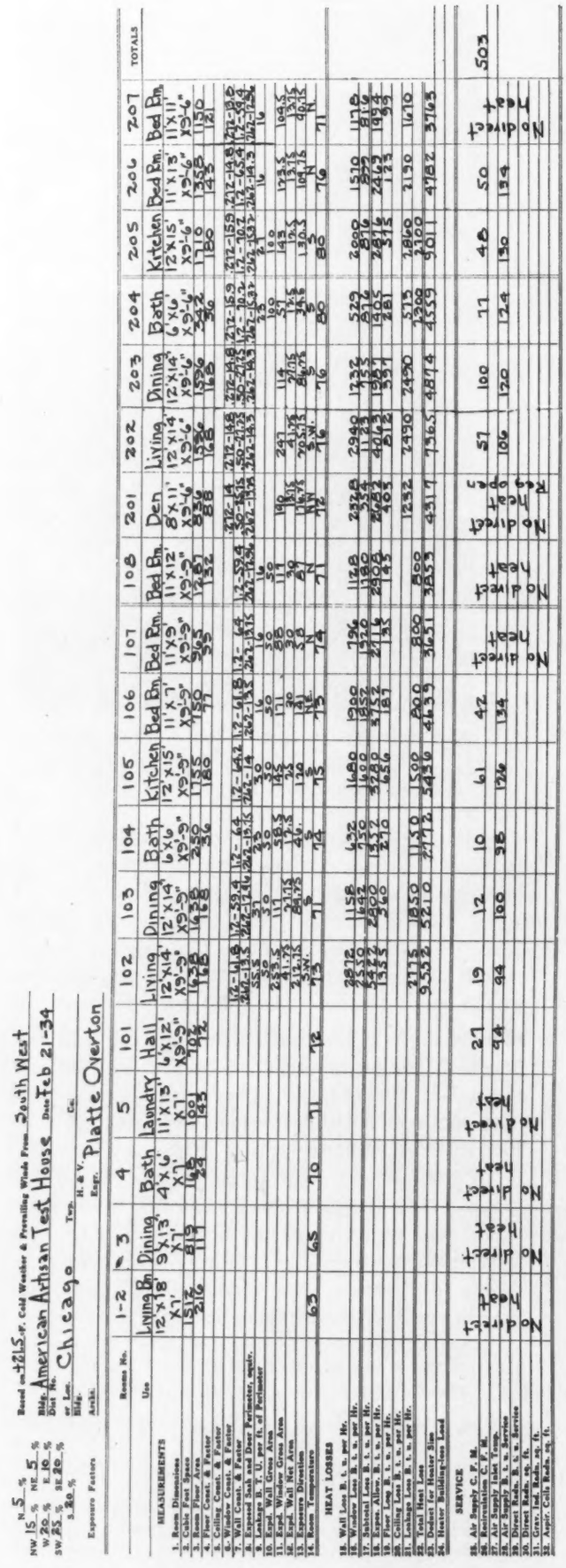
No attempt was made to cut off the fan for the gravity test. The observations and data were taken during the period when the house was being held to temperature by the gravity service. At no time during this gravity test (12 noon to 4:25 p. m.) did the fan cut in or the dampers open.

At noon the bonnet temperature was 250 degrees

POSITION of DAMPERS DURING TEST



Dampers are in position as set by the owner They were not moved for the test



Complete data sheet on gravity flow test. Compare this with data sheet for mechanical operation (February issue).

F. At 4:25 p. m., when the thermostat opened the drafts, the bonnet temperature had dropped to 220 degrees F.

While the data sheet shows only 503 c.f.m. moved to the rooms during the gravity period, this is an average as the velocities were higher at noon with the higher bonnet temperature and gradually dropped off until the fan started at 4:47 p. m. While there was a trace of warmed air entering through the registers in the rooms without direct heat or those with the dampers closed, this air was not recorded on the data sheet. The floors were warm and the chimney in rooms 105-107-205-206 helped heat these rooms. All doors between rooms were left open, a condition which is usual in this particular house.

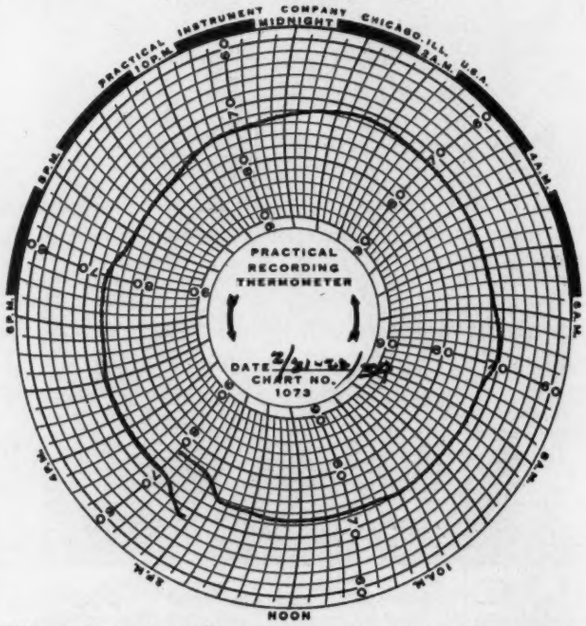
The response to the thermostat action was noted at 4:25 p. m. The temperature in room 103 where the thermostat is located fell to 71 degrees. The draft door opened. The bonnet temperature as stated was 220 degrees. At 4:47 p. m. the bonnet temperature was 283 degrees and the fan started and ran for 58 seconds, as the bonnet temperature fell to 230 degrees. The regular cycles of "off" and "on" of the fan followed (see February report).

The outside temperature was not above freezing during any period of the gravity test.

Fig. 1 is the chart taken in room 201 during and following the gravity test. Note that the temperature was 72 degrees at 3:00 p. m. The temperature in this room, which is the most exposed and the most difficult to heat, did not fall below 70 degrees in 24 hours.

It will be obvious that 503 c.f.m. at an average inlet temperature of 114 degrees will not furnish

(Continued on page 44)



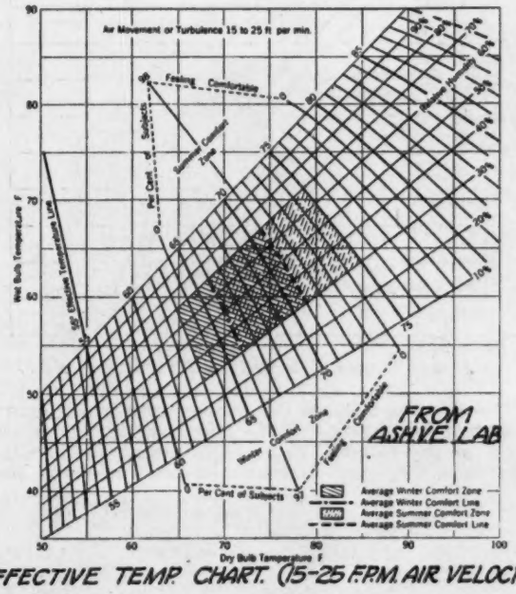
This 24-hour recording thermometer chart shows room temperatures for room 201 (hardest to heat on day of test). The gravity action is between hours of 12 noon and 4:30 P. M.

What Is This Thing Called "Comfort"

By A. P. Kratz
Research Professor
Department of Mechanical Engineering
University of Illinois

In the February issue Professor Kratz explained what comfort is, also what factors effect comfort. In this second article of the series he explains how the comfort chart was compiled, how walls and windows effect comfort. These are basic air conditioning facts every contractor should understand.

FROM the votes of the different subjects it was further determined that under winter conditions 97 per cent of them felt comfortable when the effective temperature was 66 deg. F. This effective temperature was therefore regarded as the optimum for comfort. Since 50 per cent of the subjects felt comfortable at effective temperatures of 63 and of 71 deg. F., these effective temperatures were regarded as the practical limits of the winter comfort zone, shown as a shaded area in Fig. 5. In the same way an effective temperature of 71 deg. F. was determined as the optimum for summer conditions, and the limits of the summer comfort zone were established as 66 and 75 deg. F.



EFFECTIVE TEMP. CHART. (15-25 F.P.M. AIR VELOCITY)

Fig. 5—This commonly used Effective Comfort Chart was prepared from the experiments discussed in the February and this issue. On the chart two zones of comfort—one for winter, the other for summer—were plotted (shaded areas). These zones show the ranges in temperature, humidity and velocity of air where the most subjects felt comfortable.

While it is true that at a given effective temperature within the comfort zone an equal feeling of warmth or coldness may exist over the whole range of relative humidities from 0 to 100 per cent, it is not necessarily true that complete comfort also exists over the whole range. That is, high relative humidities produce sensations of dampness and stickiness while low relative humidities produce a sensation of excessive dryness; neither one of which may be regarded as comfortable. The experimental data were confined to the range of from 30 to 70 per cent relative humidity, and within this range the majority of the subjects did not express any feeling of discomfort. Hence the comfort chart was limited to the range of relative humidities from 30 to 70 per cent as shown in Fig. 5. For winter conditions, however, there seems to be evidence that within the proper boundaries of effective temperature, the relative humidity may be as low as

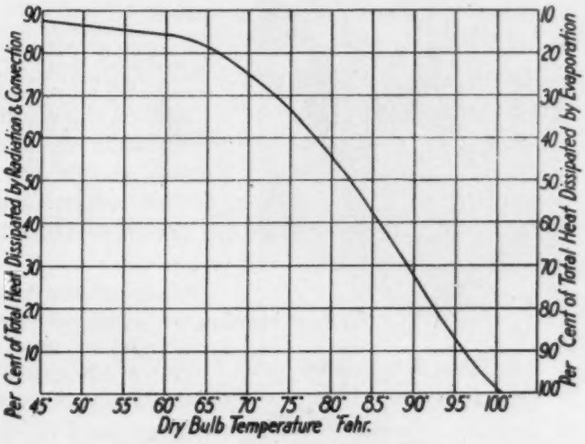


Fig. 6—This chart shows the relationship between Sensible and Latent heat losses for different dry bulb temperatures. (See text.)

20 per cent without an unduly uncomfortable sensation of dryness. There is some reason for believing therefore, that the lower limit of the winter comfort zone could be placed at 20 per cent relative humidity with some degree of safety. It should be emphasized at this point that the chart shown in Fig. 5 is valid for still air only, or air in which the motion, or equivalent turbulence, is below 25 ft. per min. The effect of greater air motion is to shift the comfort zones upward and to the right toward lines of higher effective temperature.

The preceding discussion has demonstrated that for maximum comfort in the case of a sedentary individual, the environment must be such as to permit the loss of 400 B.t.u. per hr. without the necessity for conscious bodily adjustments. This heat loss occurs in three ways; namely, by radiation to surrounding walls and objects, by convection to the surrounding air, and by evaporation from the skin and lungs. The relation between the loss by evaporation and the combined loss by radiation and convection is shown in Fig. 6. Under normal conditions, with air temperature at 70 deg. F., 25 per cent of the loss, or 100 B.t.u. per hr., occurs by evaporation and 75 per cent, or 300 B.t.u. per hr., occurs by radiation and convection. The proper function of a heating plant is, therefore, to produce an environment in which 300 B.t.u. per hr. can be lost from the body by radiation and convection.

Warm Air Heating

In the case of the warm air furnace system, the control of the heat loss from the body is effected almost entirely by control of convection. That is, if the individual feels too cold, indicating too great a heat loss, the air temperature is raised, thus reducing the loss by convection to the surrounding air. In the case of the conventional steam or hot water system, the radiators tend to offset part of the heat loss by radiation; but the major part of the action is through the agency of convection and in this type of plant also the air temperature must be increased when the individual tends to feel too cold. The various types of convector heaters produce effects lying between those of the warm air furnace and the steam or hot water radiators. All of these systems require room air temperatures ranging from 70 deg. F. at 50 per cent relative humidity to 73 deg. F. at 20 per cent relative humidity in order to produce the optimum effective temperature of 66 deg. F.

Radiant Heating

A different type of system, known as the system of radiant heating, is more popular in England than in America. In this type of plant, large panel radiators are employed, usually at comparatively low temperature and covering a large portion of the walls and ceiling of a room. Very little convection occurs and the major part of the action is through offsetting the radiant heat loss from the body. In this case, air temperatures as low as 55 deg. F. are not unusual; and comfort corresponding to 66 deg. F. effective temperature is attained by raising the mean radiant temperature, or, in other words, the temperature of the panel surfaces. The comfort chart of Fig. 5 is not applicable where this type of heating is used.

The bodily heat loss of 300 B.t.u. per hr. by combined radiation and convection is subdivided into 210 B.t.u. per hr. by radiation and 90 B.t.u. per hr. by convection. Hence, it is evident that radiation is the more important of the two, and the temperature of the surrounding walls and objects may have a more important bearing on the comfort of the individual than is usually recognized. The temperatures that may exist at the inside surface of a typical exposed frame wall, consisting of lath and plaster, 3⅝ in. studding, sheathing and clapboards, are shown in Fig. 7. Here, when the outdoor temperature was 8 deg. F. below zero, shown as an indoor-outdoor temperature difference of 80 deg. F., the temperature of the inside surface of the exposed wall was 60 deg. F. with no wind. With a wind having a velocity of 10 mi. per hr. blowing on the exposed surface, the temperature of the inside surface was only 52 deg. F. Under these conditions a slight modification must be made in the interpretation of the comfort chart. With three exposed

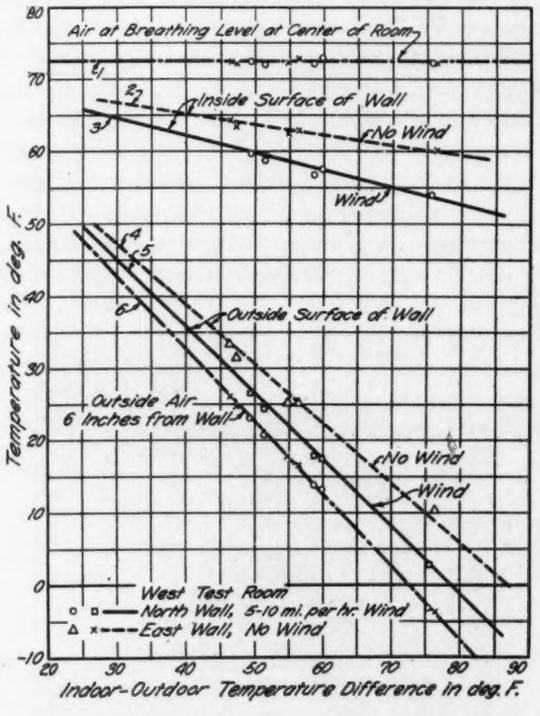
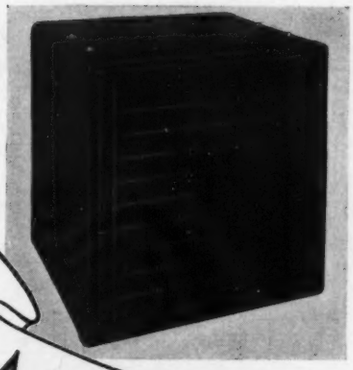


Fig. 7—This chart shows the temperatures which exist in an average frame house at the inside surface and outside surface of the exterior wall under varying inside-outside temperature differences and with no wind and with wind.

walls and with room air at 72 deg. F., if the inside wall surfaces are at 52 deg. F. the effective temperature is lowered 4.5 deg. F. over what it would be if the inside wall surfaces were at 72 deg. F. Conversely, if the inside wall surfaces are 52 deg. F. the air temperature must be increased to 78 deg. F. in order to obtain the same effective temperature, and hence the same comfort, that would exist with both air and inside wall surfaces at 72 deg. F. Naturally, the effectiveness of the wall as a heat insulator is reflected in the temperature of the inside surface. Poorly insulated walls result in low surface temperatures. The typical frame wall used for Fig. 7 had an overall heat

(Continued on page 42)



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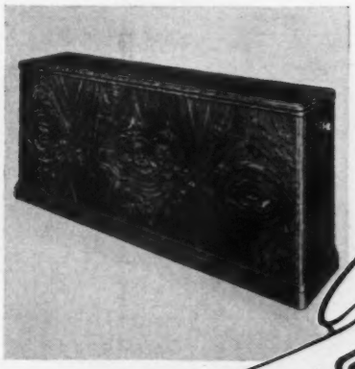

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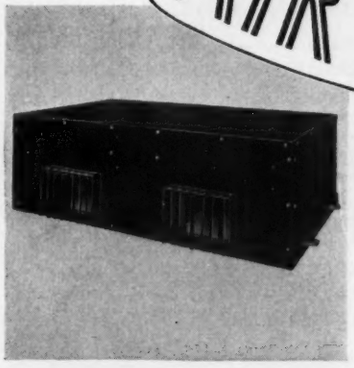

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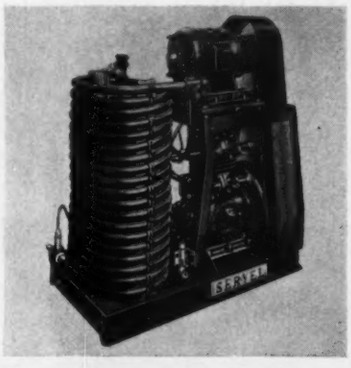

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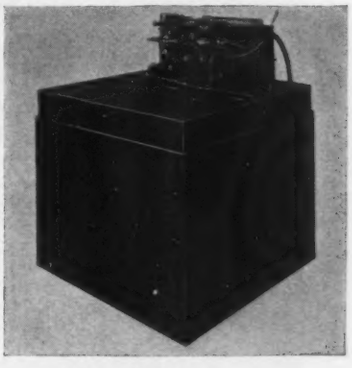
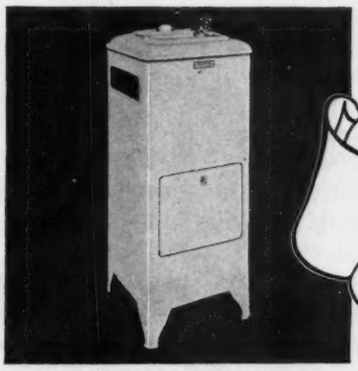


Self-Contained Milk Cooler—complete with refrigerating machine unit and cabinet. A low-priced feature for dairy territories.



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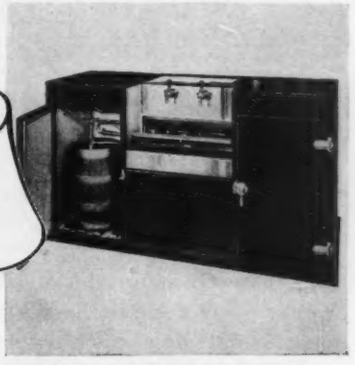

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DATA SHEET FOR COOLING INSTALLATIONS

Floor	Room	Room Dimensions	Volume Cu. Ft.	Glass Area Sq. Ft.	Net Wall Area Sq. Ft.	Clg. and Fl. Area Sq. Ft.	Linear Ft. Window Crack	Heat Gain in B.t.u. per Hour				
								Glass (a)	Walls (b)	Clg. Floor (c)	Cracks (d)	Total
1	Dining	13'-6" X 14'-0" X 8'-11"	1710	29.3	97	190	37.7	331	231	*	452	1014
1	B'K'F' Nook	—	454	11.3	41	50	16.5	128	98	*	198	424
1	Kitchen	10'-0" X 12'-0" X 8'-11"	1415	31.5	183	157	38.0	356	435	*	455	1246
1	Hall	8'-2" X 17'-0" X 8'-11"	1430	35.8	84	161	84.0	405	200	*	1010	1615
1	Living	13'-6" X 20'-0" X 8'-11"	2400	87.8	334	267	56.5	991	795	*	677	2463
2	S.W. Bed Room	12'-8" X 13'-6" X 8'-4"	1472	38.2	182	173	35.0	432	433	875	420	2158
2	Bath	—	485	8.2	58	57	14.0	93	138	288	168	687
2	N.W. Bed	10'-0" X 15'-8" X 8'-4"	1533	38.2	277	180	26.3	432	660	908	316	2316
2	Hall	8'-2" X 18'-0" X 8'-4"	1598	19.7	108 56	188	17.5	223	257 71	950	210	1711
2	East Bed	13'-6" X 20'-0" X 8'-4"	2270	63.7	334 25	267	43.8	720	795 35	1350	525	3425
											Total	17,059

aHeat gain for glass = Area of Glass × Coefficient × Temp. diff. = 29.3 × 1.13 × 10 = 331 B.t.u. per hour.
bHeat gain for walls = Area of Wall × Coefficient × Temp. diff. = 97 × 0.238 × 10 = 231 B.t.u. per hour.
cHeat gain for ceiling = Area of Ceiling × Coefficient × Temp. diff. = 173 × 0.202 × 25 = 873 B.t.u. per hour.
dHeat gain due to window cracks = Linear Length of Crack × Coefficient × Temp. diff. = 37.7 × 1.2 × 10 = 452 B.t.u. per hour.
*Heat gain not calculated as rooms are beneath cooled areas.

A Cooling Data Sheet [Part II]

IN the January issue we published part one of this article and explained how the above cooling data sheet is laid out and filled in using the formulas given below the sheet. For the benefit of readers who want to know exactly how the formulas are worked up and used we here publish detailed discussion of these formulas.

The coefficients used in the formulas are the same as those used for the same wall construction in heating. These coefficients can be obtained from any of the standard tables of heat loss coefficients.

It might be said that the formulas **a, b, c** are derived from the same basic formula:

$$H = Q \times C_1 (t_p - t)$$

in which, H = B.t.u. absorbed per hour from sun exposed surfaces
Q = Area of sun exposed surfaces
C_1 = B.t.u. conductance for the materials of the surface
t_p = temperature of outside surface
t = temperature of air inside room

It is well to note that in this formula the factor $(t_p - t)$ is variable and is adjusted for compensation of surface as, for instance, a roof which might have an outside surface temperature of 105 degrees while the inside temperature is to be maintained at 80 degrees which would be a difference of 25 degrees whereas a wall might be 90 degrees outside for an 80 degree inside temperature leaving a temperature difference of only 10 degrees. Generally walls are considered to have an outside temperature equal to the air temperature while a roof may be considerably hotter due to the effect of more direct sun rays.

Formula **d** for cracks is derived from the basic formula:

$$H = 0.24\, Q\, d\, (t - t_0)$$

in which,
H = the B.t.u. in the air from outside temperature t_0 to the inside temperature **t**
Q = cubic feet of air entering per hour at inside temperature **t**
d = weight per cubic foot of the air at inside temperature **t**
t = inside temperature
t_0 = outside temperature
0.24 = specific heat of air

It is usually sufficient to take **d** as 0.075 pound, in which case the formula becomes:

$$H = 0.018\, Q\, (t - t_0)$$

When these calculations have been made and the columns filled in and totaled there remains the selection of apparatus for size and the amount of air which must be moved to cool the house.

To determine the size of apparatus required and the air volume needed two terms must be

understood. These terms are "sensible heat" and "latent heat." Sensible heat is heat which is indicated by the ordinary dry bulb thermometer and may be roughly defined as all heat introduced by the sun shining on windows and walls, heat from persons, electric appliances, heat brought in by infiltering hot air, etc. Latent heat, on the other hand, is the heat contained in water vapor in the air and must be removed when the air containing such moisture is cooled. In cooling any space, both sensible and latent heat must be reduced in order to bring down inside temperatures.

The amount of sensible heat shown on the data sheet determines the quantity of air needed per unit of time for the predetermined temperature difference between the air entering the room and the air of the room. The sum of the sensible heat and the latent heat gives the total load for cooling.

With our problem, then, the C.F.M. will be determined as follows:

If the air is to be cooled to 60 deg. F. and the air temperature leaving the rooms is assumed to be 80 degrees, the amount of sensible heat absorbed by one pound of air will be:

$$20 \times 0.24 = 4.8 \text{ B.t.u.}$$

and the number of pounds of air will be

$$284.3 \div 4.8 = 59.2 \text{ lb.}$$

where 284.3 equals the B.t.u. per minute which must be absorbed (17,059 ÷ 60)

The amount of air in cubic feet will be then

$$59.2 \times 13.33 = 790 \text{ cu. ft. per min.}$$

where the 13.33 is the volume of 1 lb. of air at 60 degrees.

This determines the size of our fan and the amount of air we will handle through our various ducts and registers.

To find the amount of water required for sprays or coils; the amount of ice; or the size of the mechanical refrigerating unit we proceed as follows:

Water

Where sprays are used, the usual design calls for a nozzle for each 0.8 sq. ft. of cross section of the spray chamber and the velocity of the air in the chamber is limited to about 500 feet per minute in the larger sizes and 400 feet per minute in the smaller ones. The cross sectional area of the washer will be

$$790 \div 400 = 1.98 \text{ sq. ft.}$$

and the number of sprays will be

$$1.98 \div 0.8 = 2.48$$

very nearly and at least 3 should be installed. The pressure of the water at the nozzle will be approximately 5 pounds per square inch per gallon per nozzle per minute, so for 2 nozzles 7½ lb. will be needed.

If cooling coils are used, the type usually chosen is copper, although aluminum and steel are also made use of. The coils may be smooth or made

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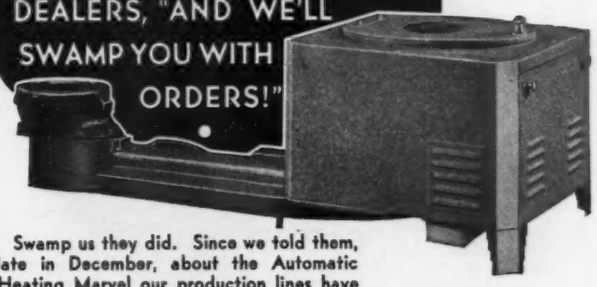

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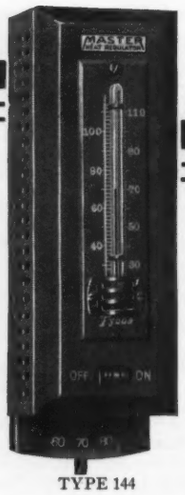

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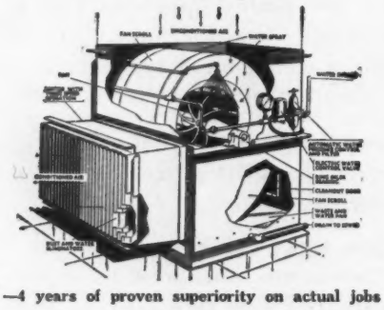

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with fins, and, as the metal wall of the pipe frequently is quite thin, the use of fins materially strengthens the pipe. The amount of pipe required depends on the load and has to be calculated from the usual formula:

Heat absorbed per hr. = area of outside surface in sq. ft. × coefficient × the temp. diff.

Taking the average temperature difference as 10 deg. F. and the coefficient of heat transfer at 5.0, the area of the coils becomes:

$$21{,}324 = \text{area} \times 5.0 \times 10$$

Therefore the area is:

$$21{,}324 \div 50 \text{ or } 426 \text{ sq. ft.}$$

With 55 degree water, at the sprays or in the coils and an allowable rise of temperature of 10 degrees, the amount of water required becomes:

$$\frac{17{,}059 + 4{,}265}{10} = 2{,}132 \text{ lb. per hour}$$

$$= 256 \text{ lb. per minute}$$

$$= 4.26 \text{ gal. per minute}$$

Ice

Where ice is the cooling medium the amount of ice required to absorb the heating load, using a latent heat of the ice as 144 B.t.u. per pound of ice will be $21{,}324 \div 144 = 148+$ pounds of ice per hour. If we assume that the water from the ice chamber enters the sprays at 35 degrees and leaves at 50 degrees we have a rise in water temperature of 15 degrees and the water to be circulated will be: $21{,}324 \div (15 \times 8\frac{1}{3}) = 170+$ gallons per hour where:

15 = degrees of temp. rise in the water

$8\frac{1}{3}$ = weight of 1 gallon of water at 62 deg.

Refrigeration

If we say for the sake of simplification that our B.t.u. total is 21,400 rather than 21,324, our calculations for mechanical refrigeration will be 21,400 B.t.u. per hour, or—using 12,000 B.t.u. per hour as equal to one ton of refrigeration—$21{,}400 \div 12{,}000 =$ practically 1.8 tons of refrigeration. If the water going to the cooling coils is held at 35 degrees then the refrigerant will have to boil in the coils cooling the water at about 25 deg. F.

The water temperature entering the air cooling coils will be 35 deg. F. and the rise of water temperature will be using 400 gallons of water per hour, and the formula—

Heat absorbed = No. gallons × 8.33 × rise of water temp.

$$21{,}400 = 400 \times 8.33 \times \text{temp. rise}$$

$$\text{therefore temp. rise} = \frac{21{,}400}{400 \times 8.33} = 6.4 \text{ deg. F. and}$$

the final temperature of the water will be $35 + 6.4 =$ 41.4 degrees.

The amount of surface required in order to re-

move 21,400 B.t.u. per hour from the air, using a mean temperature difference between the air and the water temperatures of 31.8 degrees, and a coefficient of heat transfer of 5.0 will be:

$$\text{Area, in sq. ft.} = \frac{21{,}400}{31.8 \times 5.0} = 135 \text{ sq. ft.}$$

The weight of water to be used, cooled to 25 degrees, in order to store up refrigeration during a period of 10 minutes with a rise of temperature of 5.0 deg. F. will be:

$$\text{Stored up refrigeration required} = \frac{1.8 \times 12{,}000 \times 10}{60}$$

$= 1.8 \times 200 \times 10$ and this amount must be equal to the weight of water, in pounds, times the allowable rise of water temperature. The weight will be therefore—

$$\frac{1.8 \times 200 \times 10}{5.0} = 720 \text{ lb. or } 11.5 + \text{cu.ft.}$$

and a tank 3 ft. by 3 ft. by 2 ft. high will provide about 50 per cent more volume than the amount specified.

If the air leaves the cooling coils at 60 degrees and the temperature of the air in the house is 80 deg. F., the heat absorbed by each pound of air will be the specific heat [psychometric chart for the temperature of 60° F.] times the rise of temperature $= 0.2467 \times 20 = 4.934$ B.t.u. per minute. The number of pounds of air to be circulated through the cooling coils will be, for the load of 1.8 tons of refrigeration,

$$\frac{21{,}400}{60 \times 4.934} = 72.3 \text{ lb.}$$

and the volume of air necessary to be circulated per minute will be the weight in pounds times the volume of one pound at the condition in the problem or

$72.3 \times 13.33 = 964$ cu. ft. per minute.

As the only means of cooling is in the proper distribution of conditioned air it is evident that this 964 cu. ft. per minute is the minimum number of cubic feet that can be used to absorb the load of 1.8 tons with the temperature difference of 80—60=20 degrees. Therefore a fan capacity of several hundred cu. ft. additional delivery is a move on the safe side which would allow for overload capacities or greater ventilation should this be desired.

Necessarily, these explanations of basic formulas are condensed. Any readers wishing detailed explanations are invited to write to the editors for full details.

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50,000 cu. ft. and over.....$0.10 per cu. ft.

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20,000 to 50,000 cu. ft.....$0.30 per 1,000 cu. ft.
50,000 to 70,000 cu. ft.....$0.25 per 1,000 cu. ft.
70,000 to 100,000 cu. ft.....$0.20 per 1,000 cu. ft.
100,000 cu. ft. and over.....$0.15 per 1,000 cu. ft.

Also steam, hot water, vapor systems at 1 cent per square foot of radiation. Combination systems at similarly low prices.

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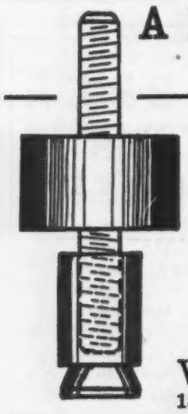

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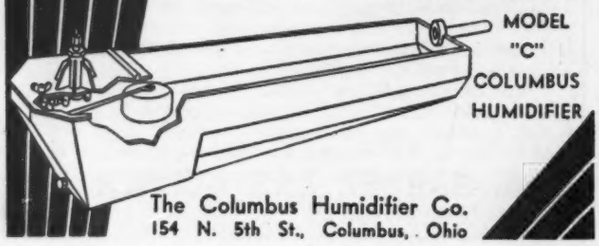

MODEL "C" COLUMBUS HUMIDIFIER

The Columbus Humidifier Co.
154 N. 5th St., Columbus, Ohio

What is Comfort?

(Continued from page 36)

transmission coefficient of approximately 0.26 B.t.u. per sq. ft. per hr. per deg. F. If this wall had been insulated with some type of filled insulation so that the overall heat transmission coefficient was reduced from a value of 0.26 to one of 0.064, the inside surface temperature with a 15 mile per hour wind and with 8 deg. F. below zero outdoors would have been 68 deg. F. instead of 52 deg. F. In this case a room air temperature of 73 deg. F. would have produced the same effective temperature as that obtained with both air and wall surfaces at 72 deg. F.

A very common source of discomfort arises from the presence of cold glass surfaces. Figure 8 illustrates the inside glass surface temperatures obtained with two windows; one equipped with tightly fitting storm sash, and the other without the storm sash. In the latter case, with an outdoor temperature 2.7 deg. F. below zero the temperature of the inside surface of the glass was 17.6 deg. F. Under the same conditions in the former case the temperature of the inside surface of the inside pane of glass was 41.3 deg. F.

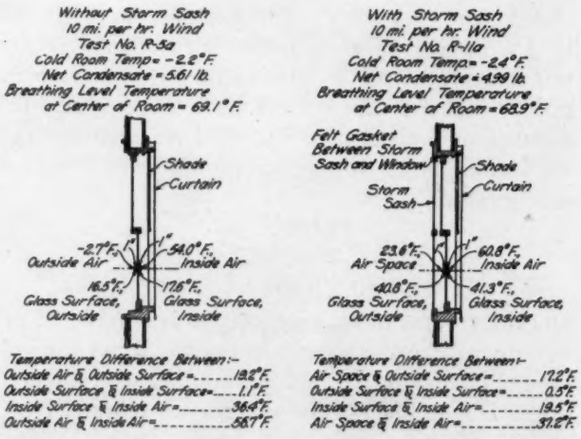

Fig. 8—You often wonder what are the glass temperatures? This drawing shows these temperatures with and without storm sash. This drawing and Fig. 7 should be used frequently.

Hence, it is evident that a few windows may be more detrimental to comfort than considerable areas of exposed wall, and that the addition of storm sash may materially increase the comfort in a room having a number of windows.

Two rather important conclusions may be drawn from the discussion in the preceding paragraphs. First, if a considerable area of cold walls and windows is present, the reading of a thermometer, ostensibly giving the temperature of the air in the room, may not afford a reliable criterion for judging the comfort of the occupants. Higher air temperatures are demanded to offset cold exposures. Second, adequate insulation and tightly fitting storm sash, besides directly saving heat loss from the structure, have an important func-

tion in increasing inside surface temperatures, and thus directly in improving comfort conditions. Furthermore, by permitting the use of lower air temperatures to attain the same degree of comfort, the use of insulation and storm sash may result in an additional indirect saving of heat.

In addition to the effect of cold walls, variations in the temperature of the air at different levels in the room may still further operate to discount the value of the reading of a thermometer as a reliable index of comfort. The most common location for such a thermometer is on an inside wall at a height of about 5 ft. from the floor. If the temperature of the air is not uniform from the floor to the ceiling, the warmest air will almost invariably be found near the ceiling. Hence, the reading of the thermometer may indicate a temperature sufficiently high for comfort while the greater part of the body may be surrounded by air at a tem-

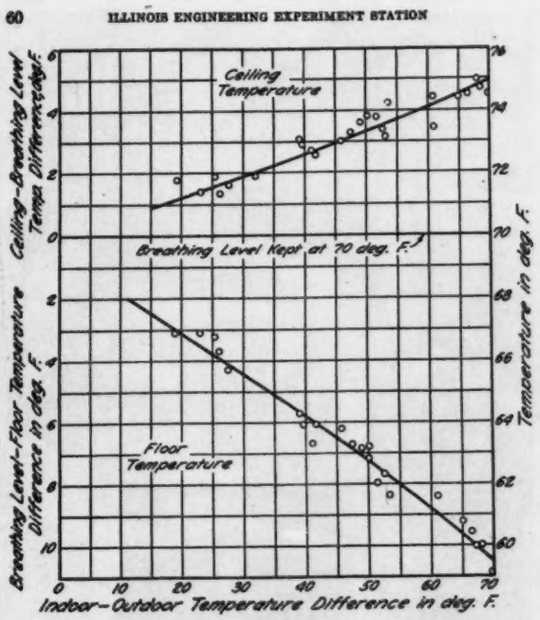

Fig. 9—Curves of floor, breathing line and ceiling temperatures for one test.

perature too low for comfort. This is particularly true for individuals seated.

Non-uniform temperatures at the different levels in a room is not confined to one type of heating plant alone, but is more or less common to all types. Figure 9 shows results obtained from a well designed gravity warm air system in which the number of air recirculations varied from 1.8 in mild weather to 3.0 in zero weather. It may be noted that with zero outdoors, or with an indoor-outdoor temperature difference of 70 deg. F. the thermometer at the 5-ft. level indicated a comfortable temperature of 70 deg. F. while the temperature of the air near the floor was approximately 60 deg. F. Hence, the body of a person standing would be surrounded by air at a mean temperature of 65 deg. F. and sitting, at a mean temperature somewhat less than 65 deg. F.

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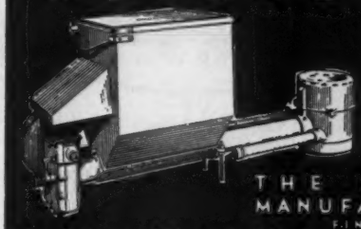
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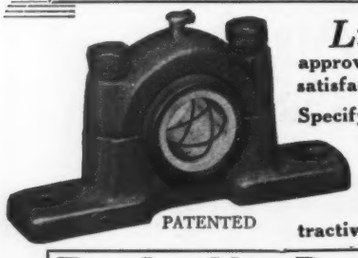

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Test House *(Continued from page 34)*

the necessary B.t.u. for the loss of the building. However, with the added heat from the floors, chimney, etc., it required 4½ hours to reduce the temperature from 73 to 71 degrees at the thermostat.

In room 103 the floor, 5-foot height and ceiling temperatures were observed. This observation was taken at 3:25 p. m. after 3½ hours of gravity service.

The readings were:

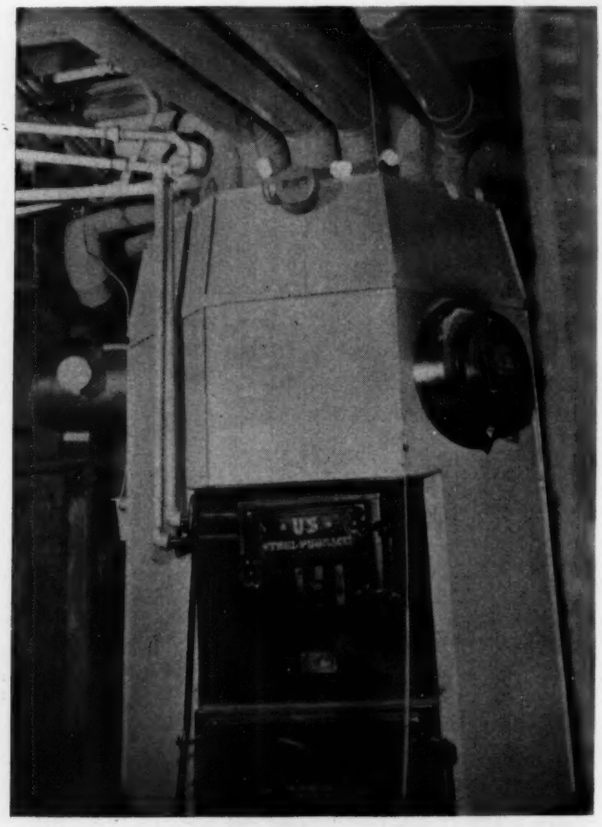
Floor line—70 degrees.

5-feet above floor line—71½ degrees.

Ceiling—78 degrees.

The ceiling in this room is 9 feet-9 inches in height or a variation of .82+ degrees per foot.

The test so far would seem to indicate that the heater is too large for the installation. The combustion rate is below a good average even in firing

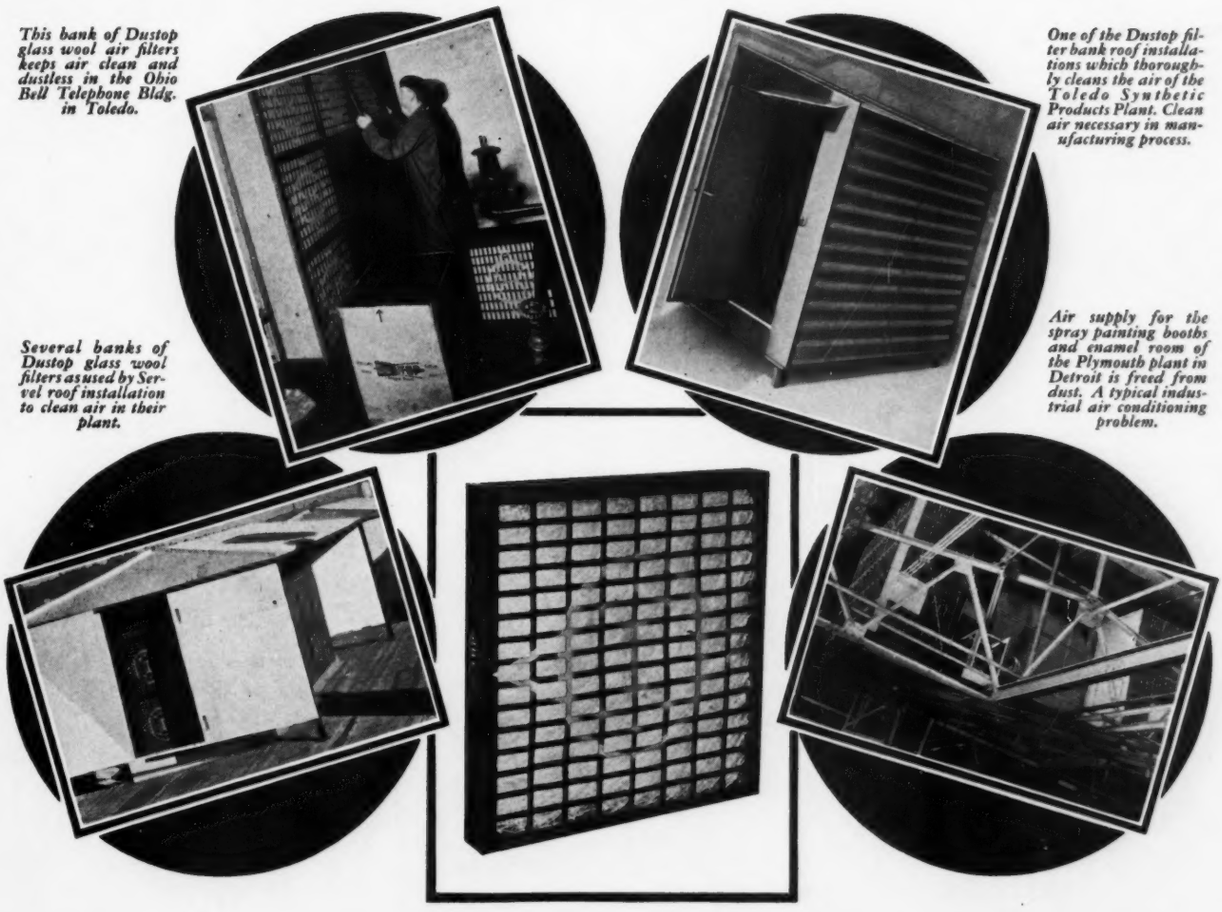


The casing is perpendicular (the camera distorts lines). The fan switch is in front bonnet, limit control in stack.

up periods in zero weather. With the dampers open a gas analysis showed 8% CO_2, but the dampers are seldom open and the average readings were from 4 to 6%.

This oversized heater, however, is not without its advantages. The large storage space for fuel with the excellent draft and control provides for long intervals between firing periods, and the heater should last indefinitely.

The April issue will contain complete information on the operation of three control systems.



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One of the Dustop filter bank roof installations which thoroughly cleans the air of the Toledo Synthetic Products Plant. Clean air necessary in manufacturing process.

Several banks of Dustop glass wool filters as used by Servel roof installation to clean air in their plant.

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ASSOCIATION Activities

Indiana

The Board of Directors of the State Association had a joint meeting with the Board of Governors Saturday, February 17th, for the purpose of perfecting plans for the administration of the Code. The Board of Directors voted to take over the administration of the Code in all of its phases. The Executive Secretary was instructed to notify the National Code Authority representative for this district of this action, giving him the outline of the history of our organization, our plan of organization, and our plan of Code enforcement.

The Board decided to use the District organization for Code administration, a record of all action to be kept at the Central Office in Indianapolis. The Code will be administered to as great a degree as possible through the District Offices, of which there are a total of eleven. Where there are several sizable towns in one District a District Governor will establish a sub-office in each town. In this latter case the sub-offices will administer the Code in their respective communities with the help and advice of the District and State offices. Details of the administration will be left in the hands of the local authorities as far as possible. Sub-offices and District offices will be allowed to group together on most questions or act independently according as local conditions make the one or the other procedure most practical.

The handling of pricing and of unethical practices will be left entirely to local authorities. The filing of bids will be handled by the District and Sub-district offices, but all bid information will be filed with the Central Office at Indianapolis.

Wages and other labor questions pertaining to local situations will be handled locally, but the State will secure whatever uniformity is necessary.

The cost of administration will be borne by all of the sheet metal and furnace and roofing contractors doing business in the State of Indiana, as provided for in the Code.

The officers of the Furmets were invited to the meeting to perfect plans for a membership campaign. Furmets agreed to participate in a contest to see which Furmet could write the most memberships. The first report of this contest will be at the Fort Wayne District Meeting on May 4th. Any payment made on Association dues will be applied against the assessment for Code administration. It is anticipated that State dues will be abandoned and the assessment against every contractor in the State for Code administration will take the place of local, state and National dues, inasmuch as the entire expense of operating these Associations will be expenses of Code administration. All other Association work is voluntary.

The above plans are subject to whatever changes are necessary to make them conform to the administration of other Codes and to National procedures.

J. A. Harris and A. E. Hartmann, who represented Indiana at the New York Conference, reported to the directors and assisted in outlining the plans. They were complimented by the Board of Directors for their effective work at the Conference.

Paul R. Jordan,
Executive Secretary.

◆

St. Louis, Mo.

On November 23, 1933, the Warm Air Heating, Air Conditioning, and Sheet Metal Contractor's Association merged with the Sheet Metal Consumer's Protective Association. The name has been changed to Associated Sheet Metal, Air Conditioning, and Heating Contractors of St. Louis, Inc.

The officers for 1934 are as follows:

President—Luke Tiernan, Jr.
1st Vice Pres.—C. F. Harris.
2nd Vice. Pres.—H. Symonds.
Secretary—W. Cavallo.
Treasurer—B. Kolbenschlag.
Serg. Arms—J. Bokern.
Directors—G. A. Frankel, R. L. Meier, F. J. Moran.

A membership campaign got under way at once and now we have a membership of 75 and hope to attain 100 more before March 1st.

Wallace Cavallo,
Secretary.

Youngstown, Ohio

The Sheet Metal Contractors Association of Youngstown and vicinity was formed last fall through the assistance of some of the members of the old "Master Sheet Metal Contractors" Association, originally organized in 1907 and for twenty years very active in roofing and sheet metal affairs locally. The initiators put on an active campaign and re-organized under the above name, adopted constitution and by-laws and selected temporary officers until the coming of our annual election, which has just been held with the following result:

George F. Ockerman—President.
Walter L. Leedy—Vice-president.
James J. Dalzell—Secretary.
Joseph R. Perkins—Treasurer.

Our meetings are held each Friday night at Plumbers' Hall, 219 Lincoln Ave., Youngstown, with an average attendance of twenty-two firms.

An address on the History and Object of the Standard Code was given before the members at last meeting by Carl B. Lockhart, a local heating and ventilating engineer who gave us a most interesting report; further talks will be given with blackboard demonstrations.

A special Warm Air Furnace Committee was appointed to arrange local regulations in conformity with National Code just signed by the President.

Our members are all interested and it looks like a busy year ahead for constructive work by the Association.

J. J. Dalzell,
Secretary.

◆

Fox River Valley, Ill.

The regular monthly meeting of the Fox Valley Furnace and Sheet Metal Contractors Association was held in the dining room of the Y. M. C. A in Elgin, Illinois, on February 12.

Thirty-eight members and several guests were present. Three new members were taken into the association. William Wolf of Elgin, Vice-president, presided at the meeting.

After routine business and the introduction of guests, Mr. Wolf introduced the president of the association, Jack Stowell, who had just returned

Association Activities . . . .

from the roofing, sheet metal and warm air heating conference and the annual convention of the National Association of Sheet Metal Contractors at the Pennsylvania Hotel in New York City.

Mr. Stowell was sent to the convention as a delegate of our association. While at the conference Mr. Stowell was elected to the National Code Authority, whose job it will be to administer the Code of Fair Competition in the Roofing, Sheet Metal and Warm Air Heating Industry. Mr. Stowell was also elected vice-president of the National Association of Sheet Metal Contractors.

The next meeting of our Association will be held at Bobbitt's Cafeteria, 10 Main Street, Aurora, Illinois, March 12, at 6:30 P. M. This will be a dinner meeting and Professor Konzo of the University of Illinois Research Staff will address the meeting.

Professor Konzo will have with him sufficient stereopticon slides to illustrate the many interesting points which he covers. This should prove a very interesting meeting and we expect to have a very large attendance.

Elmer Borman,
Secretary.

◆

Michigan Program

Following is the program of the Michigan Sheet Metal and Roofing Contractors' Association to be held in Grand Rapids, March 6, 7 and 8.

Tuesday—

Meeting of the Board of Directors, 8:00 P. M.

Wednesday—

Discussion of the status of the sheet metal dealer as effected by the National Sheet Metal Distributers' Code by A. W. Howe of the J. M. & L. A. Osborne Company.

"Conditions Within Our Industry," by A. F. Frazee of Rudy Furnace Company.

Social session in the evening.

Thursday—

Code discussions by representatives of the National Code Authority.

Explanation of the national code by Secretary W. C. Markle.

Election of the state code authority.

Annual executive session (reports of officers, selection of next convention city, election of officers.)

Meeting of Travelers' Auxiliary.

Annual Banquet.

◆

New York

Our association is now making final arrangements for our Eleventh Annual Convention which will be held in Albany, N. Y., April 9th to 12th, inclusive. The first two days of the convention are being devoted to the Code at which time the Regional Administrators will be appointed. From present indications the convention will be largely attended, as the Code hearings will be of vital interest to all contractors throughout the state.

We are also waging an intensive fight against the passage of legislation having to do with the changing of the present regulations covering heating and ventilating in the public schools throughout the state.

Several cities have already a uniform price on furnace cleaning and we intend to try and make this state wide.

We plan to have a Conference in conjunction with our convention of manufacturers, jobbers and contractors and will attempt to arrive at some understanding among ourselves whereby the industry will be placed upon a more profitable basis.

Adolph Hesse,
Secretary.

Stark-Davis Co.

(Continued from page 17)

manager and his crew are thus familiarized with the prospective business for which each salesman is striving.

"Generally, the trend in our area is for warm air heating plants in residences and up to four family flats. Fully 25 per cent of the warm air heating installations in residences are for oil burners, and much of the business that we have been obtaining during the cessation of building is for replacement of gas furnaces.

Water Heater

"We credit many of our recent heating plant sales to the fact that we have perfected and patented an automatic hot water device for oil burners, which gives automatic hot water with the oil burner in summer and winter at 50 per cent less cost than with gas or electricity. Particularly with apartment houses are we successful in closing contracts for replacements, inasmuch as the entire cost of a central furnace and oil burner is little, if any more than the year round cost of furnishing hot water with gas heat.

"This patented system stores from 30 to 500 gallons of hot water, and it is regulated by an aquastat to hold at 180 degrees without giving more than 2 degrees differential in any room in the building during the summer months. A circulating and cooling provision absorbs the extra hot water during the winter.

"Sheer necessity inspired us to develop this invention, as we realize that in this business, we must have something to offer that everyone else hasn't got.

"Price slashing is a taboo factor in Stark-Davis service. We have never prided ourselves on cheap work at cheap prices, but rather on giving to our customers the very best work we know of at a fair price."

Business Growth

In 1908, when Mr. Davis became sole owner of the business, there were six mechanics on the payroll. Due to superior service with guaranteed satisfaction the business grew gradually, till in 1915 there were 90 mechanics employed. "The after-the-war slump reduced our number of employees to about 20, convinced the company that diversity of service would be required in order to promote further growth so between 1920 and 1925 the company diversified its service and sales by adding electrical contracting, electrical merchandise, steam and hot water heating.

"With four separate departments," says Mr. Davis, "each of which is developed to a high degree of efficiency, we have been able to keep a full time staff of 40 mechanics busy at all times, in addition to more than a dozen on the sales and office force."

The main Stark-Davis store is located in the heart of Portland's down town district, close to the public market center. A branch store is located in the city's busiest sub-business territory.

New PRODUCTS

Electro-Sheet

The American Brass Company, introducers of thin copper sheets to be used in place of felt in built-up roofing, announce two new products—Electro-Sheet backed up with Sisalkraft building paper and backed up by Asbestos Felt.

The Sisalkraft sheet is available in rolls containing 100 square feet with copper weighing either 1 or 2 ounces per square foot. The material is laid in the same manner as felt in built-up roofing.

The Asbestos Felt backed up sheet is supplied in rolls 15-inches wide and 45-feet, 7-inches long. The material is unrolled as laid and provides a permanent metal roof with the insulating and protective qualities of asbestos felt.

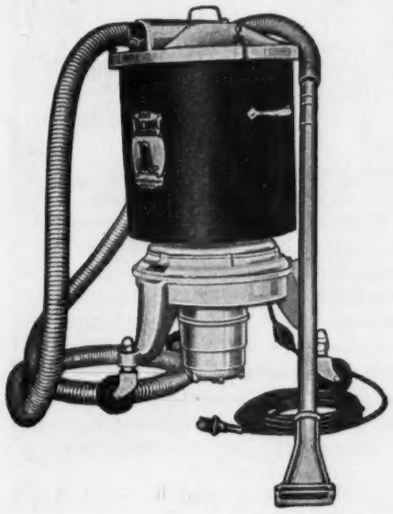
Information on these two new products has been compiled in leaflets which carry a sample of the material. Contractors may obtain the leaflets and samples by addressing the company.

◆

Kent Cleaner

The Kent Company, Inc., Rome, N. Y., announce a new model known as the Kent Double Suction, especially adapted to furnace cleaning which offers a number of points of superiority over previous models.

In the new model a double suction is obtained by the use of two turbine fans powered by a ¾ H. P. motor.



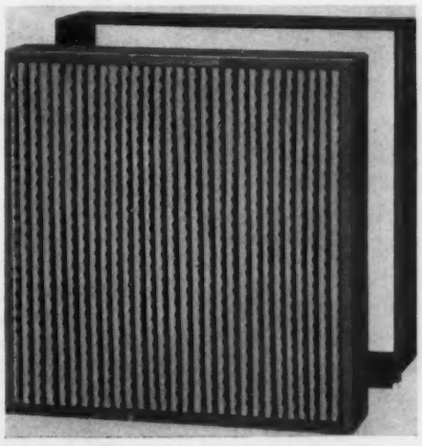
The motor is encased in aluminum and the dirt bag is entirely enclosed in a strong steel can set above the motor and fans. This arrangement allows no dust or dirt to pass through the fans, thus lengthening the life of the working parts. A spark catcher has been provided so the cleaning can be done even if there is a fire in the heating plant.

The machine is mounted on three sturdy rubber tired swivel castors, making it easily portable. It fits into any car, and can be separated into two parts with conveniently located handles for carrying in and out of houses.

◆

Airmat Drifilter

The American Air Filter Company has recently introduced a new type of



renewable or throw away filter called the "Airmat Drifilter" for which they claim the same high efficiency as standard Airmat filters with the added advantage of low first cost and inexpensive maintenance.

The Drifilter element or cell is made of a continuous sheet of 6-ply Airmat filtering material folded back and forth over corrugated spacers and securely encased in a heavy cardboard channel section. This construction makes it possible to obtain approximately 30 square feet of filtering area in a single unit 20 inches square by 4 inches deep. After the cell has accumulated its full dust load, it is discarded.

The Airmat Drifilter Type K consists of a filter element and a permanent metal frame. The frame is provided with clips for holding the filter cell in place and arranged for bolting adjacent frames together to form an installation of any desired capacity. Each unit is rated at 600 to 800 cfm, depending upon the amount of dust in the air. The initial resistance at 600 cfm is .10 inch and at 800 cfm, .185 inch w.g.

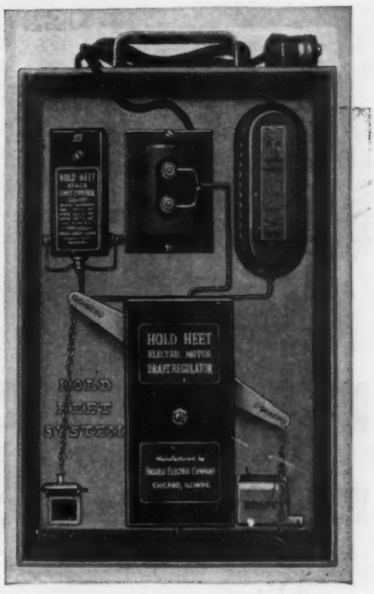
◆

Russell Demonstrator

A demonstrator for the Russell Electric Company, 342 West Huron St., Chicago, "Hold-Heet" regulator set is announced by the company.

The limit control, room thermostat, damper motor and transformer are housed in an aluminum cabinet and wired for connection to an electric light socket. By setting the dial on the room thermostat the entire system can be made to operate just as it does in actual installations.

The whole cabinet is small and light enough to be carried by the salesman or used by the contractor to demonstrate the operation of automatic control. Full information on the unit with its prices may be had from the company.



Sure they talk about them!

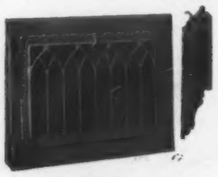
Listen:

"This register is so much nicer than the other heating company proposed. Much more attractive and modern looking. And more convenient too—just a touch operates the valve and it stays where you place it. You can tell by the finish and other details that it's a better product in every way."

H & C
Symbol for the most complete line of fine registers to be found anywhere.

. . . that's the kind of good-will job H & C registers do for the furnace installer who uses them to put his deals across. It's a plus feature that costs you nothing, and consequently one that you can ill afford to do without.

If you haven't already standardized on the H & C line, begin doing so now.



No. 120 Baseboard Register. Companion line to our very popular No. 110 Series. The stackhead overlaps the frame.

HART & COOLEY MFG. CO.
CAST AND STEEL H&C WARM AIR REGISTERS
GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO

New York, 101 Park Ave. Boston, 6 Beacon St.
Philadelphia, 1600 Arch St. New Britain, Conn., Corbin Ave.

The Education of a Moujik

By Ivan Nitchevo

Chapter II

FEODOR'S real surprise came when he learned just how the Apex Sheet Metal Shop obtained the work that kept himself and his fellow workmen busy.

Instead of waiting for a customer to come into the shop, as he and his father did in Russia, the boss was on the go all day long and far into the night, to get, "jobs to figure."

Then there would be a session of frenzied figuring, much delving into old files to find a similar job. Then a search through the books to find out how much he had made, or more frequently lost on the previous work. With this information at hand, an estimate of the job in question would be made.

Then the boss would cut a few more corners and submit the price to the customer.

Feodor couldn't understand it. The boss was trying to see how little for which he could offer to do the work, while Feodor knew there was so much material required and it took a man just so long to do the job; at least a man like Feodor, who always took pride in his work.

He was just beginning to suspect the meaning of such terms as "Overhead," "Fixed Charges," "Cost of Doing Business," "Profit," "Percentage of Return," "Volume," "Interest on Investment" and the methods of the boss served only to increase his bewilderment.

After being bawled out several times for putting in too much time on work that had been taken too cheap, he asked: "Mr. Boss, you always have to be lower than anybody else to get this work?"

"Not always," said the boss. "When times are good, sometimes I can get a preference for a good job. But prices are so lousy now that it seems that price is the only thing that counts."

Feodor smiled hopefully. "Then Mr. Boss, all you have to do is raise the price and then you make money."

The boss eyed him, cynically. "Sure," he said, "and let competitors grab all the work."

"But," said Feodor, "they are losing money too. Then they raise their prices and everybody makes money."

It seemed simple to Feodor. But alas, these Americans, somehow they made even simple things seem very complex. But then he had not yet absorbed the dominant American trait of optimism that makes business men put money in dry oil wells, play the horses, buy stock, or believe that by doing work for less than their competitors, they can make money.

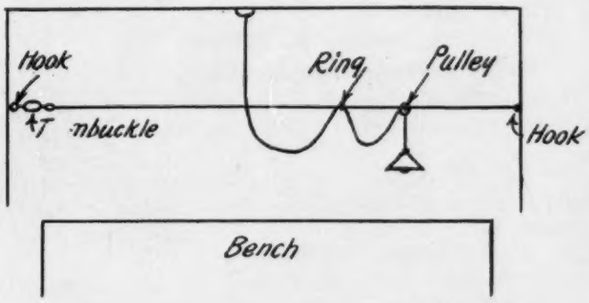
One evening after quitting time he walked into the office. (To be continued)

Kinks . . . .

SOME time back we men in this shop were having difficulty with the lighting system over the benches. We did not want to put in more lights because even then the light would not always be directly on our work.

So we worked out the idea shown in the drawing which has proved very successful in our shop.

First we put a small pulley, such as a furnace regulator pulley, on a wire and stretched the wire



across the shop over the bench. By means of a small turnbuckle we pulled the wire tight.

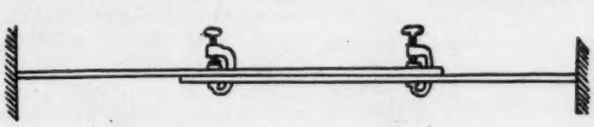
Then we took a long length of light cord and ran the cord from the socket about mid-way along the wire and connected the other end into the socket which carries the reflector. The light cord is passed through a small ring which holds up the slack and slides along the wire. The cord also passes through the pulley so that the light may be raised or lowered as required.

Carl J. Peterson,
Corry, Pennsylvania.

* *

SHEET metal workers are often obliged to do fitting jobs with more or less accuracy. A measurement that often ends in disaster because it is not accurately made involves the exact distance between two objects which cannot be measured directly with a rule, cannot be measured with a stick that is too long, or with one that is too short.

An excellent kink for obtaining the exact distance is shown in the accompanying sketch. Use two sticks such as laths or anything else sufficiently



stiff. The total length of the two must be somewhat greater than the distance between the walls or objects being measured so that they will overlap as shown. Put them together in contact as indicated and slide outward until the two ends make contact with the desired points. Then clamp or fasten them together as shown, and you have the exact distance.

W. F. Schaphorst,
New Jersey.

★
MAKE MORE
MONEY ★In the shop
★On the Job ★When you sell

THERE is three-way profit for you when you sell ARMCO SHEETS . . . At the point of sale because Armco INGOT IRON has been advertised and accepted nationally for 20 years as the foremost low-cost, rust-resisting sheet metal . . . In the shop because Armco INGOT IRON is soft, uniform and free-working. It cuts labor costs and helps you turn out neat, tight work. And Armco INGOT IRON measures up to the job because it goes in fast and pleases your customers, not only when the job is done but for a long time afterwards. Start using Armco INGOT IRON. See how much easier it sells and satisfies people—with the help of the many sales aids that ARMCO Distributors offer. Your distributor salesman will explain the whole money-making plan. Ask him about it next time he calls.

THE AMERICAN ROLLING MILL COMPANY
Executive Offices. Middletown, Ohio

ARMCO
THE SHOP-SAVING IRON
THAT SELLS EASIER

News Items . . . . . .

Michigan State Short Course

The program for the third forced warm air heating and air conditioning short course to be held on March 26, 27 and 28 in R. E. Olds Hall of Engineers, Michigan State College, East Lansing, is as follows:

Monday, March 26

10:00 A. M. Lecture on heat loss calculations, including transmission, infiltration and exposures and introducing and explaining a calculation sheet. Each student to be provided with a sheet.

1:00 P. M. Calculation session where each student is provided with prints of a house and is guided while he calculates heat losses. Questions solicited and answered. Student will complete calculations at home.

4:00 P. M. Lecture on Combustion, Draft and Chimneys.

7:30 P. M. Demonstration using draft gauges, CO_2 Analyzers, Anemometers and other air flow instruments. Each student is given opportunity to familiarize himself with each piece of apparatus.

Tuesday, March 27

9:00 A. M. Check heat loss data giving correct values for further use.

9:30 A. M. Lecture on registers, their characteristics, their location, and resultant air velocities. Discussion and calculation period during which students may size and locate registers which would, of course, fix quantities of air.

11:00 A. M. Lecture on procedure in duct layout. This will include, in addition to pressure losses and balancing, a discussion on noise and its elimination, and some cost data.

1:30 P. M. Students proceed to lay out the ducts on their job under guidance.

4:30 P. M. Lecture on fan characteristics and selection. The speaker will select a fan for the job under consideration.

6:30 P. M. Banquet. Speaker on non-technical subject.

Wednesday, March 28

9:00 A. M. Lecture on oil burners followed by discussion.

10:30 A. M. Lecture on stokers followed by discussion.

1:30 P. M. Lecture on air cleaning, humidification and cooling. Calculation and applications to the residence in question.

3:00 P. M. The A, B, C's of Automatic Control.

The fee is $3.00.

◆

Revere Appointments

Revere Copper and Brass Incorporated announces the following changes in the General Sales Department of the company:

J. A. Doucett, formerly Vice President and General Sales Manager, has been appointed Vice President in Charge of Sales, and C. A. Macfie, formerly Assistant Sales Manager, becomes General Sales Manager.

In his new position Mr. Doucett will give special attention to matters pertaining to the NRA Code of Fair Competition of the Copper and Brass Mill Products Industry, as well as to company policies, and Mr. Macfie will devote his time to general company sales activities.

Both of these men will be located at the Revere Executive Offices at 230 Park Avenue, New York City.

a swing to copper

for better installations

HUSSEY

The value of long-life materials on permanent installations can be measured in dollars saved—satisfaction assured.

Copper is coming into its own with this demand for continuing performance under exceptional as well as normal conditions.

Experienced and successful sheet metal men make it a point to recommend copper, knowing the ultimate savings to the owner and the better immediate profits and prestige to them.

Such contractors depend on the unlimited facilities available on call through Hussey service.

Whatever it is in copper—sheets or manufactured products, Hussey gives immediate action from main plant or nearby branch warehouse.

You can profit by the swing to copper and the unusual support we can give you on all copper requirements.

DISTRICT SALES OFFICES

BALTIMORE CINCINNATI NEW YORK
BUFFALO CLEVELAND PHILADELPHIA
CHICAGO ST. LOUIS PITTSBURGH

WAREHOUSES

CHICAGO NEW YORK PHILADELPHIA
CINCINNATI CLEVELAND PITTSBURGH
ST. LOUIS

MILLS AND EXECUTIVE OFFICE
PITTSBURGH

C. G. HUSSEY & COMPANY
PITTSBURGH, PENNSYLVANIA

News Items . . . . . .

Ressler East for Ryerson

Harold B. Ressler, Vice President in Charges of Sales of Joseph T. Ryerson & Son, Inc., at Chicago, will move to New York to take charge of their Jersey City plant, and will maintain a close contact with the other eastern Ryerson plants at Buffalo, Philadelphia and Boston.

This move is made owing to the resignation of J. A. McNulty, former manager of the Jersey City plant and on account of the importance of this plant and the other eastern properties of the company.

Mr. Ressler has been with the Ryerson Company for 30 years, and prior to his moving to Chicago in 1929 was manager of the Ryerson St. Louis plant for 15 years.

◆

Displays Equipment

A Detroit distributor of Gar Wood heating and air conditioning equipment believes in actual demonstration to sell his goods. This distributor, Radio Distributing Co., also sells other household devices.

When the prospective buyer of heating and air conditioning equipment comes into the place he or she is immediately ushered into a room that is completely heated and air conditioned by the very equipment that is on display. This room is attractively decorated and is furnished with an expensive library table and half a dozen luxuriously upholstered chairs. The thermometer will show 72 degrees. Another instrument will show the relative humidity at 45 per cent, both maintained uniformly winter and summer.

In one corner is an air-conditioning system that circulates filtered, tempered, humidified air, in winter, through a

system of ducts built into the ceiling, with interior construction visible through plate glass windows.

In another corner is a Gar Wood Tempered-Aire system—a warm air oil-burning heating cabinet hooked up with an air conditioning cabinet. This system is also connected with the duct system. Either the warm air or the boiler system (steam or hot water) may be operated to condition the room at the will of the attendant, by merely throwing an air valve in the duct system.

Provisions for both winter and summer air conditioning have been made. For summer cooling, city water is circulated through the conditioning cabinet until that water, later in the season, grows too warm. The system is hooked up with a refrigeration unit for the more extreme summer weather.

◆

American Sheet and Tin Plate Appointment

The American Sheet and Tin Plate Company, Pittsburgh, Pa., announces the appointment of Charles Schramm to be assistant manager of sales of the New York district.

William A. Wein has been appointed assistant manager of sales of the company's Pittsburgh district sales office.

Do You Need This Profit From Service, and This Aid in Selling New Plants?

INCOME from service keeps equipment dealers—notably auto dealers — profitably in business. Furnace dealers have little right to expect enough money on new plants alone, any more than does the dealer in motor cars, electrical household equipment, business machines or anything else that requires service.

A good service department in furnaces pays a nice profit and keeps the equipment you sell in good working order—thus enhancing its reputation—and it leads you directly to people who are good prospects for new plants. If you let others clean and service your plants, the next thing you know your old friend has bought some new plant but not yours.

The first line of attack by any furnace service department is a Super Suction Cleaner. A dirty furnace, choked smoke pipe, plugged chimney, and dusty air ducts can and do cause more complaints than should be endured. You are not compelled to submit to them.

The Super is shipped to you today fully equipped with special extra tools for cleaning smoke pipes, air ducts, chimneys (from the basement —not the roof), and at no increase in price. We also give you free the Plan Book which tells you how to get service jobs. We will send you a Super for free trial—you keep what it earns during trial period. Why not get into business all over? Send for your Super now and get busy.

The National Super Service Company
1944 No. 13th St., Toledo, Ohio

USE THIS COUPON

The National Super Service Co.,
1944 No. 13th St., Toledo, Ohio
Send me a Super Suction Cleaner for free trial for 3 days after arrival.
Tell me all about the Super and the free trial offer.

Your Name.....

Street Address.....

City and State.....

There's PROFIT in Jobs on Which You Use

Apollo ChromCopper

APOLLO ChromCopper is a safe metal on which to build a lasting foundation for profits. It is a sheet that you can use in landing jobs that call for a reasonable outlay of cash. It is a sheet which you are safe in backing with a guarantee of endless satisfaction.

APOLLO ChromCopper resists tarnish and is rust proof. It is strong, but pliable and works easily. It is not discolored by fruit or food acids nor deteriorated by alcoholic concoctions. It is priced within reason and available from jobbers' stocks or direct from the mill in sheets 36" x 96".

Let us send you a sample for your assistance in working up business that yields a good margin of returns in dollars and cents. Write today to

APOLLO COMPANY

Box AA · La Salle, Ill.

CHRISTIE
FURNACE VACUUM
CLEANER

A One-Man
Super Powered
Machine

$99.50

Subject to Change Without Notice

F. O. B. Cincinnati with Tools and Attachments.

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

CHRISTIE CLEANER COMPANY

Division of The Cincinnati Sheet Metal & Roofing Co.

226-30 East Front St. Cincinnati, Ohio

Salesmen: A few choice territories still open.

News Items . . . . . .

Meyer Furnace Sales Conference

A sales conference was held during the last week in January by the Meyer Furnace Company and was attended by all the traveling men and jobbing representatives.

The illustration shows the members of the sales and

jobbing staff and readers will recognize many of the men in the photograph.

Those attending are as follows: Left to Right, Front Row: F. E. Mehrings, W. E. Look, Chas. Spindler, George F. Meyer, George Harms, W. E. Nesbit, F. L. Meyer, H. W. Bauman. Middle Row: Joe Lucas, R. E. Asher, Erwin Eichenberger, C. E. Helme, O. F. Rempe, E. A. Hansen, R. S. Quimby, F. H. Geer, H. C. Hoffman, Otto Falkenhainer, H. L. Jackson. Back Row: Louis Demmler, W. J. Boesch, J. B. Sauer, L. M. Baugh, G. A. Kelly, G. A. Dancy, E. A. Reed, A. R. Lyon, H. V. Walker, V. S. Losch.

◆

Ryerson Buys Bacon and Company

Joseph T. Ryerson & Son, Inc., of Boston, New York and Chicago, has purchased the stock and good will of Bacon & Company, iron and steel company of Boston.

◆

W. F. Angermeyer Dies

Wm. F. Angermeyer, Pittsburgh "old timer" in the sheet metal industry, died February 12. Funeral services were held the following Thursday.

"Bill" Angermeyer had been one of the really active members of the various associations, both local, state and national and was known throughout the country for his long, untiring service to his industry.

◆

Mont. H. Smith Dies

Mont. H. Smith, long identified with the heating and ventilating industry, died at Elizabethtown, Penna., on January 18, 1934.

Mr. Smith was the author of "The Furnace Man's Handbook" and was for many years associated with The International Heater Co. as manager of their Philadelphia branch. He retired from active business in 1927 and had for the past two years steadily declined in health.

Mr. Smith was born in Albany, N. Y., March 30, 1852. He is survived by his widow and one son.

◆

Barber Representative

The Barber Gas Burner Co., Cleveland, Ohio, announces the appointment of Homer C. Hull as territorial representative in the Chicago district, including surrounding territory within radius of 300 miles. Mr. Hull will handle the complete line of Barber gas burners and gas pressure regulators and will have his headquarters at 6509 S. Richmond St., Chicago. For the past nine years Mr. Hull was with American Gas Products Corp., division of American Radiator-Standard Sanitary Corp., as sales engineer and supervisor in the Chicago territory.

News Items . . . . . .

New Round Oak Officers

Round Oak Furnace Company, by letter dated February 7th, announced to their trade the following officers elected at their annual stockholders' meeting, February 3rd:

F. E. Lee, Chairman of Board of Directors.

Harry C. Howard, President.

James F. Firestone, Vice President in Charge of Operations.

John F. Nugent and F. S. Cole, Vice Presidents in Charge of Sales.

Harry C. Mosher, Secretary and Treasurer.

◆

New Inland Tin Plate Plant

The Inland Steel Company has recently completed a tin plate plant—part of the development started in 1931 with the completion of the continuous strip plant for producing hot rolled strip and sheets, and the cold rolled plant for producing such cold rolled products as furniture

sheets and auto body sheets. The new addition will absorb the products of the hot rolled strip mill, reducing the strip in gage and processing it into Inland tin plate.

The new plant consists of the five-stand tandem mill shown here, a 38-inch Steckel Mill on which light weight strip for tin plate will also be produced, annealing furnaces, pickling equipment, and tinning equipment. The plant will have a capacity of approximately 10,000 tons of tin plate per month.

◆

Special Representative

The Board of Directors of the National Association of Sheet Metal Contractors announces the appointment of Mat H. Friedman as special representative for the association. His duty will be to contact state and local bodies with the view of being of assistance to them in organization work.

For the present Mr. Friedman's efforts in this work will be confined to the territory adjacent to the Chicago district, which includes Wisconsin, Indiana, parts of Missouri, Michigan and Ohio.

Mr. Friedman's address is 407 South Dearborn Street, Chicago.

◆

Whitney Metal Corp. Patents

Announcement is made that there is no patent infringement on the Whitney shanks and circles, excepting the No. 6 and No. 10 shanks which are the only ones covered by the Nord Patent No. 1,920,520, referring to a specific form of attachment of the plate to the stem, having nothing to do with the circles at all, or with the other shanks not using the plates.

What! *No New Building?*

Well, what of it? There are plenty of old furnaces right around you that need replacing. The Moncrief line with its completeness and high quality gives you every advantage in competing for this business.

Write for particulars of the Moncrief proposition.

MONCRIEF NRA WE DO OUR PART

CAST *and* STEEL FURNACES
GAS FURNACES
AIR CONDITIONING SYSTEMS

We Supply Everything Used on a Warm Air Heating Job.

The Henry Furnace & Foundry Co.
3471 E. 49th St. Cleveland, O.

Branches and Distributors in principal cities.

WHITNEY LEVER PUNCHES

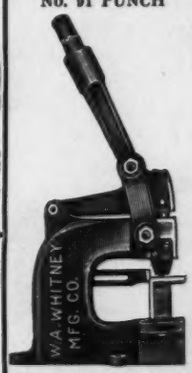
No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅜" to ⅝" by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅝-inch iron; especially adapted for button punching or templet work. Punches and dies ¼" to ⅝" by 32nds.

No. 91 PUNCH

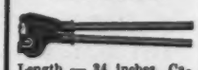


Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5-inches. Weight — 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

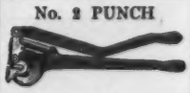
Ask your Jobber

No. 1 PUNCH



Length — 34 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅝ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅝-inch hole through ½-inch iron. Punches and dies in sizes ⅝-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

PERFORATED METALS

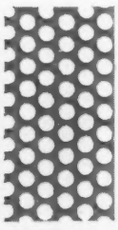
Every Sheet Metal Worker needs perforated metal in one form or another.

For processing food products and to withstand certain chemicals, perforated Stainless Steel and Monel Metal are much used.

Factory Safety Guards—For this service perforated metal has no equal.

For Grilles, Radiator Enclosures, Air Conditionings, Cabinets, we have many beautiful designs.

Write today for information and prices.



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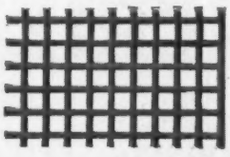

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Detailed information sent promptly—give us the word.

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News Items . . . . . .

Minneapolis-Honeywell Field Clinics

Beginning a series of field clinics at Chicago, January 24, the Minneapolis-Honeywell Regulator Company launched a novel program of meetings with its field men, engineers and officials throughout the national territory. In so doing the company has reversed the usual procedure by bringing the home office to the field force, rather than the field force to the home office.

Designated as field clinics, the gatherings embodied not only sales conferences, but also engineering discussions and genuine clinics on trends in the heating and air conditioning and processing field, with reports on improvements and new developments and projects. The Chicago gathering is shown in the photograph.

The company anticipates a greatly increased volume of sales in 1934, states C. B. Sweatt, Vice President in charge of sales, basing his prediction on a greatly improved buying interest on the part of the public and a tremendously increased interest of the public in both temperature control and air conditioning.

◆

Fox Furnace Exhibit

The accompanying illustration shows the exhibit of Fox Furnace Company equipment at the Third International Heating and Ventilating Exposition held last month in New York City.

The exhibit featured the company's air conditioning gas furnaces and air conditioning coal burning furnaces. Complete equipment was included with each unit and facilities made it possible to run the fans in order to show operating methods.

◆

Change of Address

The Chicago office of the Allen Corporation has been moved to Room 608, 325 West Huron St., Chicago. F. B. Sale is in charge of the office.

New Literature . . . .

Cleaning Manuals

A new portable model furnace cleaner has just been announced. This new cleaner is known as The Henry Brown Electric Furnace Cleaner. The machine is said to develop unusual power as well as being compact, durable and portable and low in cost.

A series of service manuals is also offered with the cleaner. These manuals are clearly written and offer to the operator many years of practical heating plant cleaning experience.

New attractive literature is available by writing direct to Henry Brown, Asheville, N. C.

◆

Ozone Catalog

The Triox Engineering Co., St. Louis, Mo., has prepared a loose-leaf catalog describing and explaining the company's ozonizing and ionizing equipment.

The various pages explain the functions of the equipment and the changes made in air composition through use of this equipment. Many practical facts regarding ozonizing and ionizing are contained in the text. Data is given on the methods for determining size of equipment, arriving at costs of installation and operation and specifying for the various types of units.

Capacity charts for various building areas are given with various ventilating specifications and the correct size of equipment to be used.

Contractors interested in this feature of ventilation may obtain copies of the booklet by writing the company.

◆

Stran-Steel Literature

The Stran-Steel Corp., Detroit, Mich., has published two new booklets; the first, describing the Stran-Steel house at the Century of Progress and containing complete photographic views of the interior and exterior, plus complete descriptions with drawings of the construction of the house. This booklet gives complete information on the various types of materials used in the house together with information on the application of the materials. The booklet is profusely illustrated with photographs and drawings showing features of construction and erection.

The second booklet is entitled "Advance Data Sheets for Architects, Contractors and Builders" and contains information on the pre-fabricated members used in this type of construction with detailed drawings showing dimensions and forming for all typical units. Detailed plates show methods of erection and application of exterior and interior surfacing together with tables of weights and loads.

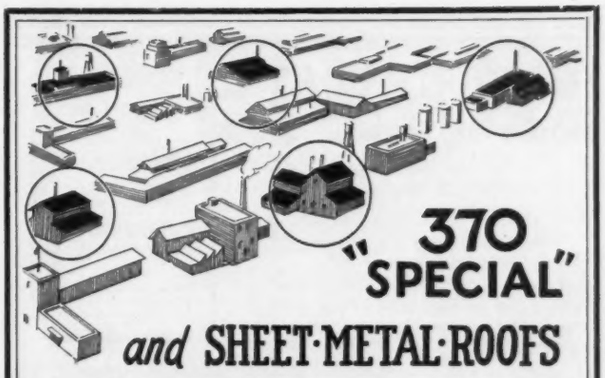
Contractors desiring information on this metal house development may secure copies of the booklets by writing the company.

◆

Oil Heat Booklet

An unusually interesting booklet describing the advantages of oil heat has been prepared by the Wayne Oil Burner Corp., Fort Wayne, Ind. The booklet is modern in composition with excellent photographs and drawings showing the disadvantages of out-of-date heating equipment and explains in order such difficulties as coal dirt, soot, uneven temperatures, etc.

The illustrations are highly interesting from a prospect's point of view and very little explaining is required to bring out the points emphasized. Copy of this booklet may be obtained from the Wayne Company.



"370 SPECIAL" and SHEET-METAL-ROOFS

LOOK down upon the roofs in your community. Single out those roofs that are sheet metal and then make it your business to do the painting job.

And keep this in mind—*sheet metal roofs must be painted regularly in order that they continue to protect the buildings they cover.* Sheet metal roof painting is business that is constant and profitable.

With the fact that roofs must be painted regularly already established, the question that is important to you is, which paint to use, to do the job most satisfactorily and economically.

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Other Thompson Products—Alumbrite—the new Aluminum Paint for Wood and Steel and Lin-O-Jap, the Perfect Reducing Oil for All Paint.

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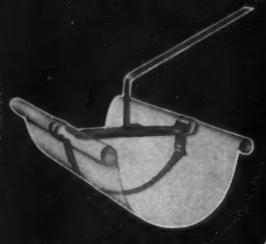

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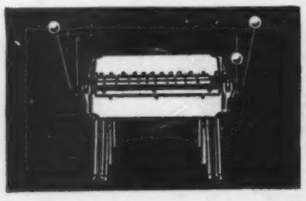

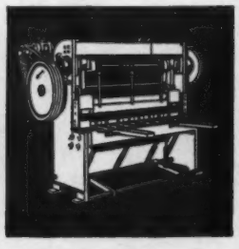

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Any REPAIRS FOR STOVES BOILERS and FURNACES
A.G. BRAUER SUPPLY CO. SAINT LOUIS
ALL IN ONE SHIPMENT TO YOU

New Literature . . . .

Stainless Steel Booklet

A very elaborate booklet presenting many of the uses for stainless steel has been compiled by the Committee on Stainless and Heat Resisting Steels of the subsidiary companies of the United States Steel Corporation.

The booklet contains numerous illustrations of typical applications of stainless steels to tank trucks, stairways, plaques, machinery guards, food handling machinery, kitchen equipment, utensils and such special items as beer drums and store fronts.

The booklet is arranged by sections which discuss the characteristics of the metal, give the recommended uses for the various forms of the metal on the market with information on annealing, welding, forming, drawing, riveting, spinning and polishing.

A full description of the various types of material now on the market is also presented with recommendations for proper use of each material.

Copies of this booklet may be obtained by addressing the committee at the Frick Building, Pittsburgh, Pa.

◆

Supply Catalog

A tinners' and roofers' supply catalog "General Catalog No. 10-B" will be mailed by Berger Bros. Co., 229 Arch St., Philadelphia, Pa.

The catalog contains full information on terms, discounts, methods of shipping, etc. In the 182 pages the company has shown and itemized all the numerous products of their line covering gutters of all types, gutter fittings, downspout pipe and fittings, hangers, guards, fasteners, ventilators, roofing sheets, metal roofing, skylights and accessories and dozens of miscellaneous items.

The pages show illustrations of the items, give sizes, materials, and tabular information. Tools and machinery, registers and grilles and ornamental items are also included.

◆

Crystal-Cote Booklet

The Copper & Brass Research Association, 25 Broadway, New York City, has published a booklet discussing Crystal-Cote, a surface coating for copper and its alloys to preserve the natural beauty of the material.

Crystal-Cote is specially melted glass applied in a very thin layer to the metal surface. This glass coating is transparent and may be used as a clear color or colored by the application of special materials.

This interesting development is discussed in full in the booklet giving the history of the research behind the development, the various uses to which the process may be applied, the physical properties of the glass coating, results of tests on the coating and the characteristics of the covered metal.

Contractors may get a copy of the booklet by writing the association.

◆

Zinc Price Sheet

A sheet and ribbon zinc price list, effective January 31, 1934, will be mailed to contractors by the Matthiessen & Hegeler Zinc Co., LaSalle, Ill.

The price sheet contains quotations on sheets of various thicknesses and sizes in varying quantities; also prices on ribbon zincs and tables of weights, thicknesses and gauges.

Copies may be obtained from the company.

New Literature . . . .

Nested Duct Work

The F. Meyer & Bro. Co., 1311 South Adams St., Peoria, Ill., manufacturers of the Handy line of stacking, present full information on their new Nested duct pipe for mechanical warm air heating in a booklet just published.

Illustrations and text explain the construction of the duct work, how it is shipped and assembled; give full information on such accessories as heads, elbows, angles, Y's, T's, and explains how these items are assembled for a complete duct system.

All items in the new line are tabulated by size with prices for each item. Typical duct plans are shown with sizes and information on how to estimate the price of the pipe work required for the job illustrated.

The back part of the catalog contains price lists of registers and grilles, jobbed by the company.

Contractors doing mechanical warm air heating may get a copy of this interesting bulletin by writing the company.

◆

Brass Manual

The Bridgeport Brass Company, Bridgeport, Conn., announces a new manual covering complete specifications for brass and commercial bronze sheets and rolls, rods, shapes, wire and identical information for phosphor bronze metal.

The manual gives full specifications for all the materials presented with gauges, widths, lengths, weights, finishes, and characteristics. The catalog also presents information on tubing and hot rolled sheet copper.

Copies may be obtained by writing the company.

◆

Slate Booklet

A pictorial presentation of the many interior and exterior uses of slate for floors, terraces and walks, photographs showing typical installations and information on methods of laying in various designs, plus a complete specification for such construction has been compiled in a booklet—A. I. A. File No. 22 B2, prepared by the National Slate Association, 644 Drexel Building, Philadelphia, Pa. Copies of the leaflet will be mailed to contractors interested in laying slate.

◆

Steel Ceiling Catalog

A new steel ceiling catalog No. 179 is announced by the Edwards Manufacturing Co., 5th & Butler Streets, Cincinnati, Ohio.

The new catalog gives information on estimating the area, figuring the cost and shows typical illustrations of metal ceilings applied in stores, banks, basements and all types of structures.

In addition, a complete pictorial presentation of the company's line of steel ceiling patterns and designs is given. Each design is accompanied by full instructions on the cornice, molding and plates used with the design and the cost per square. Contractors may obtain copies of the catalog by writing the company.

RYERSON

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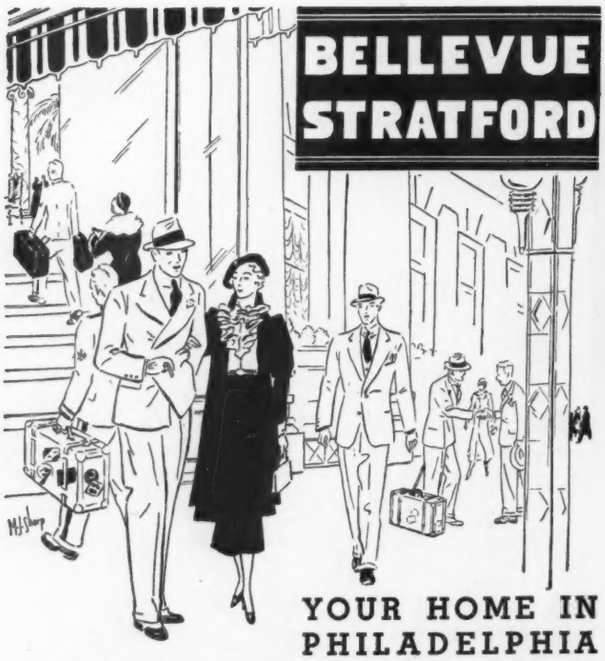

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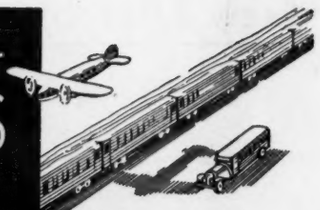

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IF you expect to have anything to do with the planning and installing of air conditioning systems, Samuel R. Lewis' book, "AIR CONDITIONING FOR COMFORT" is the answer.

AIR CONDITIONING FOR COMFORT is the first complete book of facts and data on air conditioning. Its 244 pages are alive with the tables, diagrams and essential data which an engineer or contractor must have to properly estimate or design a job, be it skyscraper or cottage. They definitely set forth the practical formulas for computing the components of the various heating, cooling and de-humidifying systems. Best of all, you don't have to be a trained engineer to get the meaning out of them. They are easily understood.

The book describes the advantages of water, ice and mechanical cooling for different conditions. It describes the practical application of temperature and humidity control systems to warm air heating systems, and after giving you the facts that show what system will be best for your particular job, the book tells how to figure the conditions in the space to be cooled, how to figure the equipment necessary to do the job, etc.

Examples of warm air, hot water, steam, and combination hot water and warm air installations are taken up in turn, and the data sheets filled in ready for specifying efficient, economical atmosphere control systems.

The book will yield the answer to practically every question on air conditioning that may arise, and once you have made yourself familiar with its pages, you will find it invaluable as a constant reference guide on air conditioning facts.

AIR CONDITIONING FOR COMFORT will be sent at once upon receipt of $2. Furthermore, if you decide to return it within 10 days we will refund your money.

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Chapter 1.—Explanation of Terminology.
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Chapter 3.—Relation of the Human Body to Air Conditioning.
Chapter 4.—Influence of Type of Heating System on Air Conditioning.
Chapter 5.—Heat Transmission Through Building Materials.
Chapter 6.—Calculations for Air Conditioning Requirements.
Chapter 7.—Sunshine, Evaporation, Air Leakage and Lighting.
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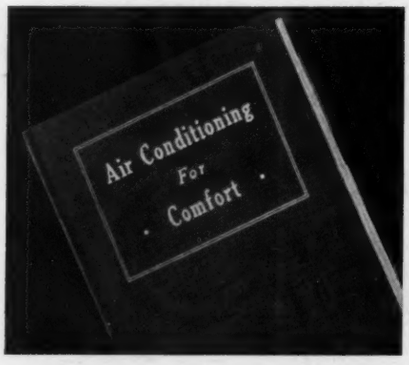
Chapter 12.—Computations for an Actual Design.



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WANTED: ONE GOOD SHEET METAL worker and one ventilating man. $1.00 per hour. Give full information. Address Key 267, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATIONS WANTED

MANUFACTURERS AGENCY FOR ST. Louis, Mo., and surrounding territory, for items used by Tinners, Roofers and Furnace Contractors. Advertiser is competent Sales and Heating Engineer. Has excellent connections with large contractors. Can furnish best of references. Address Key 266, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

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Beaders 6" thr. $10.00; 12" thr....$27.50
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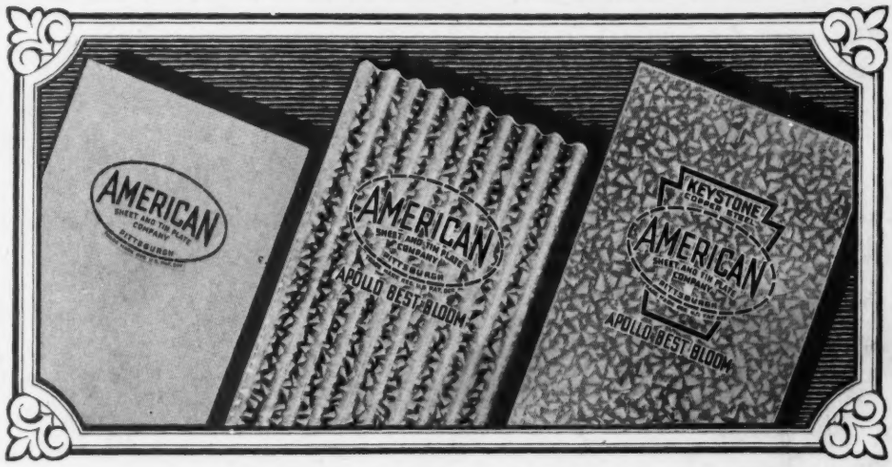

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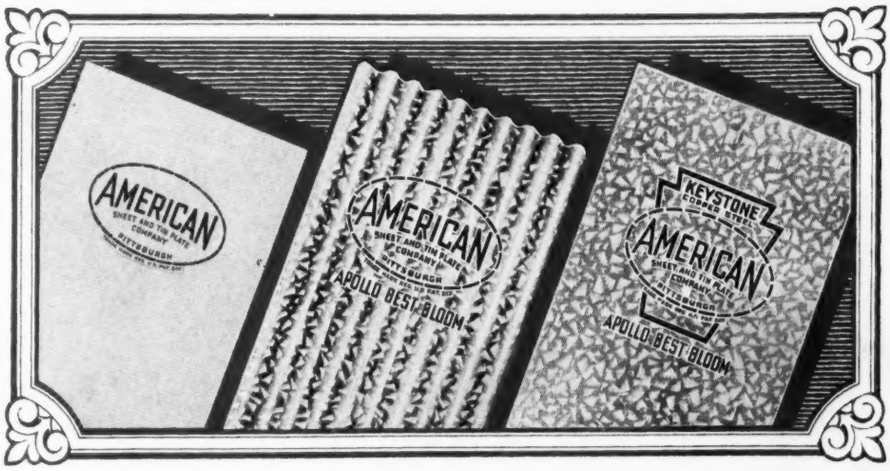

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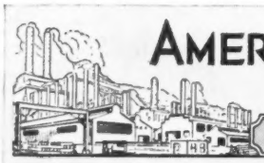

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